The Builder.

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Harmony in Colour and Sound.

IT is a hard saying of Dr. Helmholz,* that for all the marked analogy that exists between sound and light (light, like sound, is dependent on the undulations of a special medium, and its undulations, like those of sound, are subject to the incidents of interference, and vary in effect according to varied rapidity of vibrations), all this agreement notwithstanding, there is, we are told, one material failure of physiological analogy as between the organs ultimately addressed, the ear and the eye, and in consequence "the eye has no sense of harmony answerable to that of the ear,—it has no music."

Such is the paradox to which an investigator arrives, and so complacently is he apt to accept it who follows too exclusively the clue that has served him for one-half of the labyrinth he investigates. He would usually do well, since the object is not merely to get out of the labyrinth, but to explore it,—to cast himself free for a change from his favourite guide even the more readily because he might reasonably apprehend temptation to favouritism. Let him strike for once independently into a road that at first seems to lead widest away, and so may he, perchance, for the first time master the true bearings of his former track by looking over it from new points of view.

The sense of musical harmony, says Helmholz, depends ultimately upon this physiological peculiarity of the ear which we have been expounding; and, as there is nothing answerable to this in the eye, as the eye has no power of resolving a compound colour into its constituents (green, for example, into blue and yellow), as the ear distinguishes the overtones,—the harmonics, combined in a note, by a faculty which is the condition of the sense of musical interval,—the eye is excluded from a sense of harmony. And yet is there surely another aspect, a different entrance, to the subject.

The harmony of colour is a matter of experience—the highest of all matters of fact. The discordance, even to painfulness, of some combinations of colour to cultivated and refined senses, is as real as is the painfulness of a wound with a knife. As matter of fact, this is established far on the hither side of any æsthetical speculation; and the pleasures, no less than the pains, from this source, being facts in sensation, must needs have, like all other such, a set of facts in physics and facts in physiology too, of like diversity to back them and account for them. We do not need philosophy to explain what the material diversities are upon which the differences of two colours depend, in order to be assured that a difference of such kind there must be; and if combined colours are in some cases delightful, and in others, at least with equal certainty, disagreeable, we justly assume that the primary physical difference affecting tint is susceptible of still another variation, affecting pleasantness; and we hold fast by this conviction, however reluctant physiology may be to go at our bidding on a search for its material vindication, however positively she may avouch on her return from the excursion that none such exists. If the physiological comparisons of Helmholz are really well founded, we are perfectly entitled, apart from a possible error in his inferences, to enunciate that it is the ear which has a disability as compared with the eye. Taking our stand upon the restricted analogy of the eye, we might rashly infer that, being destitute, as appears, of a power of distinctive appreciation answering to that by which the eye becomes susceptible of harmony, it is the ear that must be condemned as incapable of music. Harmony is a term so constantly associated with sound that we are apt to assume that sound has an exclusive, or at least a prerogative, right to it, and to the idea that it expresses. But this is gratuitous. Harmony is a word that simply translates into Greek, fitting, or adjustment in coincidence,—coincidence in the very widest application, and limited to no one sense, and no sets of senses, and not, indeed, to the senses at all.

The word harmony in itself, then, meaning accurate fitting, it is found consistently used by the ancients to express even a detail so secondary after all in architecture as the wonderfully close jointing of marble ashlar in a Greek temple. But a certain dignity has accrued to the word, and it is, therefore, now the appanage of noblest applications. Thus it is applicable currently to conditions of social life, to tranquil order, or effective discipline,—the order that may "reign at Warsaw," or might be established by a Spartan Harmost,—and to the liveliest and happiest activity, effective co-operation in a family, a firm, or a constitutional government.

The essence of harmony, then, is the exquisite adjustment of differences, of whatever kind, with each other, to whatever agreeable result; and this adjustment is in general form dependent upon apt modification of degrees, of quantities, as amongst the associated elements. The value of the result depends on the delightfulness it realizes; but the process and its theory are no more the property of the ear and the musician than gravitation pertains especially to the bodies most conspicuously heavy, or that prove, it may be, to have the greatest specific gravity.

When, therefore, we speak of an experienced pleasure as due to harmony of colours, it is clear that we postulate, and surely equally clear that it is with justice, the dependence of our pleasure on degrees and differences, in quality, arrangement, coincidence; on colours, not merely as such, but as adjusted thus or thus relatively to each other. Such a pleasure of the eye manifestly corresponds in the general principle of its conditions with the pleasure derivable from simultaneous sounds adjusted to each other in degree and coincidence, in a manner to be consistent with, to conduce to, enhanced enjoyment,—that is, that are in harmony.

We conclude, then, that either the special faculty of the ear to which Dr. Helmholz ascribes its competence to appreciate harmony of sounds has not, if it exists, any such prerogative function; or else that the eye is endowed with an analogous faculty which has yet to be searched for, or ultimately it must have some compensating relation to its objects as coloured that makes its sense of harmony,—its musical competence,—independent of any such condition.

The inquiry, therefore, it is clear, may be taken up independently from the side of vision, and the conditions of visible harmony,—the music of colour,—as matters of experience and experiment, must provide the leading clue; while the physiology of the ear and the conditions of audible harmony become but matters of reference, and when glanced towards for an analogy must be ever jealously repulsed at every attempt to impose dictatorial mandates.

The ancients were, doubtless, justified in the enthusiasm with which they fixed their attention on the hint ascribed to Pythagoras of the mathematical quantitative relations sublying the consonances of musical notes, and right and sagacious also in their assumption that the analogy must hold good through the whole of nature. But erring in a too cramped comparison, they expected that the music to be detected in the rest of the universe would adhere to details that, in truth, resulted from special and distinctive conditions of sound; and so the theorem became fairly exposed to an objection that, inasmuch as the conditions failed elsewhere, the assumption of music elsewhere than in sound was a mere delusion. It may have been too early in antiquity for such a paradoxical protest, however provoked, to be ventured on, and it is too late now for us to rest in it.

The larger theory, with all its defects, did not do the world ill service; it originated schemes of astronomy, not to say of theology and creation, in which the visible planets were forced with some violence to assume the intervals of the diatonic scale; but it was the conviction,—the primary assumption,—of a harmony that held Kepler to his work: assuredly it led him a strange dance, and desperately did he strain the records of observers on the racks of prejudiced imagination. Practice teaching him independence, however, he waded clear from a slough of more artificial absurdities than ever before did a benefactor of his kind entangle himself in, and came out at last holding high above his head those half-dozen sentences,—the laws of Kepler,—that vindicated his earliest assumption of cosmical harmony at the same time that they convicted of absurdity all his earliest conceptions of it.

When the solar beam was first drawn out before a really philosophical eye, into a sequence of bands comprising every characteristic colour, the ancient prepossession was again prompted to seize upon its theory; and intervals and intensities of colours were soon impressed as rigorously as had been the planets before them; and all was done that could be, and ineffectual but pitiable enough it was, to make them also keep step to the march of sound. In due time light made good its claim to have a vibrating medium, an elastic ether of its own, and was then allowed to escape from the restrictions of the audible gamut; its right was by this time established, to participate in the mathematics of vibration; and pulses, waves, and interferences, as we have seen, are common to the philosophies of the sister senses. But this being so, in the face of common experience and current expression before the claim of the eye to a harmony of its own is given up, we must surrender plausible analogy as well as palpable experience, and in such case it will assuredly be the fault of the expounder if the sacrifice has to be allowed.

The colours of nature are as varied and numerous at least as its sounds; and as sounds are recognised as either noises or notes, accordingly as they affect the ear, or fail to affect it, with a pleasing unity, a certain wholeness of resonance,—by experiment it is found, accordingly as they are due to more or less regular vibrations,—so have colours a difference appreciable by the eye by which we recognise them

* "Ueber die physiologischen Ursachen der Musikalischen Harmonie." Heidelberg.

as more or less pure,—more or less delightful and susceptible of delightful combination. The natural colours of flowers are especially beautiful; and in colour to be beautiful is to be pure. In using the word pure, we may seem to be assuming a theory; but, in truth, we are declaring an experience,—the experience that the beauty of a colour concurs with a certain sense of undisturbed unity, of a leading effect not interfered with and reduced in value by foreign admixture.

And this touches, in fact, upon a main point in dispute. If the eye cannot distinguish pure blue and red in the secondary purple, how is it likely to be able to separate the still more complicated impressions that impair the effect of a colour that ought to be a pure primary. It is sufficient in the first place, so far as the sense of harmony is in question, for the eye to be competent to condemn a colour as defective in clearness, decisiveness, and homogeneousness, without pretending or caring to specify the cause. This is what eyes, finely gifted with sense of colour, certainly can do with wonderful nicety, this and much more, as certainly as every musical ear appreciates the purity of a note. The test of pleasure approves or condemns with every degree of vigour, from absolute repugnance, to satisfaction rested in as entirely undisturbed and complete. Moreover, to assist appreciation of present effect, the eye has memory, and the eye has imagination; it can recal and conjure up, if not the actual spectra of impressions of colour, some perfectly serviceable associations with them. Then when intrusive and impairing tints do not betray themselves immediately even to the best and cultivated eyes of an artist, they respond as to a test on the approximation of another tint; and the actual application of the testing colour as it heightens or declines in effect by proximity of the first, makes the existence of a latent peccant admixture as manifest as the application of a sounding-board makes audible the note of a vibrating rod.

The delightfulness betrays to the sensitive that there must be some cause for it, and for every mode and qualification of the delightfulness, though it is far from giving direct information as to the physical nature of the causes. These qualifications are endless yet most definite, and the eye does not wait for a justifying experiment when it responds to severe provocation, and calls many a bad colour dirty,—the contradiction of pure. We may rejoice when physicists trace and inform us of the causes of the differences, but we want no information from them as to the fact of their existence.

Purity and impurity of tint are quite distinct from darkness or lightness, deepness or its antithesis, and therefore we assume that it depends on a defect of composition in the colour itself. The impure colour is thus of necessity a mixed colour, and the impurity must arise from a defective proportion between the elementary colours involved; the remedy remains to adjust this proportion and so reduce the colour to a pure one. Here, then, the eye recognizes a pure tint as the ear a pure note, and in one case as in the other, the ultimate cause probably depends upon coincident or non-coincident vibrations; but in any case as regards the sensibilities of the organ, it is matter of adjustment—of harmony.

Let us now assume that we are in possession of a pure colour, be it natural or artificial. We may consider it as variable in degree of deepness of tint without its ceasing to be the identical colour. By way of illustration this is effected by successive layers of the same pure pigment: how successfully this can be achieved in practice, it may not be easy to say. The principle, however, is secure; and if, in applying each wash successively, we leave an uncovered margin, we shall or ought to produce a scale of gradation from deepest to lightest tint of the particular colour.

The most natural comparison of the steps of such a scale is to the repetition of a single note from the lowest to the highest pitch; but in the case of a musical note we proceed from octave to octave, and each successive note ascending is produced by double the number of vibrations of its antecedent. It would seem as if there was no such limitation to the degrees of a colour. The limits of musical octaves is reached after comparatively few repetitions, but the gradations of a colour seem infinite. Is it possible that in this sequence there may be degrees which give peculiar excellence by some law of interval? At any rate, tints taken out of such a series are to each other in a relation of harmony that will seem, until the physicist can show us otherwise, very fairly analogous to unison in the music of sound. The frequent application of this harmony in decorative work is familiarly called putting one tint of colour in relief on another of the same.

When we come to compare one colour with another, with others, we are not far from this discovery, that they admit of being all arranged in a sequence that has, at least, an analogy with a scale of notes, as one element of the succession,—one colour as one note,—follows another in easy and agreeable succession, until our circuit comes to an end by our being reconducted to the starting place,—to the colour we commenced with,—by a gradation as easy as that by which we left it.

Further, when a succession of colours has been disposed by no other rule than easy gradation and visible relationship; when green has taken its place between yellow and blue under no other guidance than our sense that it has gradations within itself of which some lose themselves gradually in blue in one direction and the rest verge towards yellow in the other, and so of the rest,—this verdict of the eye is found to be confirmed by the changes that are independent of sensation. The prism arranges colours in the same order as the eye; and no less independently than notes upon a gradually shortening string assume the same order that the ear would give to them though ignorant of their dependence upon strings of certain length or strings at all.

We must carry on our remarks in another number.

IRISH RAILWAYS.

A VERY momentous subject is now occupying the attention of the Government, and was recently debated in Parliament, and that is, the present state and condition of the Irish railways. It appears that upwards of 27,000,000*l.* have been absorbed in the construction of them, and that the great majority of the lines pay little or no dividend. The parties whose capital is embarked in these undertakings are clamorous for the Government to purchase them, or to make some endeavour to improve their financial condition, either by taking them into their own hands, and leasing, or otherwise, to competent parties, who would guarantee a moderate dividend, or by a system of amalgamation to lessen the working expenses, so that a better dividend might be realized from the property.

It is stated that the gross income derived at present amounts to 900,000*l.* a year, or 3½ per cent. on the gross expenditure; and this railway property may be purchased for 19,500,000*l.*, and it would therefore pay 4*l.* 12*s.* per cent.,—not a bad per centage in these days of panic; but if the money could be borrowed at 3 per cent., it would take 634,000*l.* to pay the interest, and leave a surplus of 266,000*l.* to the Government. Again, it is held out that by a system of amalgamation and consolidation of interests a considerable saving may be made in working expenses, amounting, it is said, to at least 80,000*l.* a year, and making a total profit of 346,000*l.* for the purchase, leasing and working the lines upon the most approved system, and which might be applied in the reduction of the fares, or in improved facilities for the traffic, and increasing the accommodation to the population of Ireland.

There can be no doubt that the present lamentable position of the Irish railways has arisen in a great measure, like that of their English contemporaries, from a variety of causes, over which Government and Parliament ought to have exercised a more vigilant supervision and control. It appears from a Parliamentary return, that the legal and Parliamentary expenses of these lines have amounted to the average of upwards of 1,000*l.* per mile, and some lines have paid as much as from 1,500*l.* to even 2,400*l.* per mile, for the discharge of this simple and preliminary business. And this does not include the expenses of the long and costly feud between the London and North-Western and the Great Western, and other lines.

This exceedingly heavy expenditure certainly reflects no credit upon the country; and if Parliament had exercised ordinary vigilance and precaution, this dead weight upon railways might have been considerably lessened or modified. It has been the unwise and variable policy of the Legislature, with reference to railways, that must be ranked as one of the principal causes of their present embarrassed state and depressed financial condition.

Another "Old Man of the Sea" that has hampered and oppressed them has been the enormous sums paid for land and compensation, the sums paid by many of the companies having been almost of a fabulous amount. Land valued at 5,000*l.* previously to a line of railway being projected, has been sold to the company when formed for 120,000*l.* A great portion of the land taken for railway purposes has realized to the fortunate owners prices varying from 2,000*l.* to 10,000*l.* per mile; and it is upon record that the sum paid to one wealthy landholder for his land, and to buy off his Parliamentary opposition, was so preposterously large that after his death his heir absolutely returned the greater portion of it as conscience-money. In another instance a proprietor of a small piece of land received 5,000*l.* compensation for loss of minerals under it, and the minerals had absolutely been worked out as far as was practicable, the remainder being hopelessly submerged in water. Their market value was absolutely *nil*, but a railway land agent appeared upon the scene, and he converted, as if with the wand of a magician, these fabulous minerals into bright and sterling gold.

The wrongs that have thus been inflicted upon railway property might be multiplied; but we have said enough to produce a lasting impression as to one of the great causes of railway depression. Another cause which has operated unfavourably has been an extravagant outlay on works; as if railways had not suffered enough from legislators, lawyers, and landholders, the contractors must step in to superadd to the evil, and to heap Pelion on Ossa.

Too much money has been spent in ornamental work of a costly character, where substantial and less expensive work would have sufficed, except to establish reputations; double lines have been made where single ones would have served the purpose; and works have been carried out at a lavish expenditure, and without any attempt at economy; and contractors (once navvies and masons) have realized large and even immense fortunes, and have become the envied purchasers of some of the richest domains of our ancient gentry and aristocracy.

Other evils have arisen from the construction of branch lines on the same expensive system as the main lines, the purchase of contractors' lines at exorbitant prices, and giving unduly considered and ruinous guarantees. There is scarcely one of our main lines whose dividends have not gradually become reduced year by year, from 14, 12, and 10 per cent. from the above causes; and to prevent competition by keeping out other companies from their district,

"Fine by degrees and beautifully less,"

to 5, 4, and even less per cent.; and now every one looks with suspicion on railway securities, and many congratulate themselves, and say, "Thank God, I am not a railway shareholder!"

But, notwithstanding these adverses, however, and while the effects from them continue, we must not expect a considerable extension of the railway system in this country until confidence is restored and they are put into a financially good and proper position. There is hope dawning in the future; and in the same way that the Government could relieve a panic or great pressure in the money market, as in May, 1866, they could place railways in that position that would enable them to work out their own redemption.

It is highly desirable that the railway system in this country should be extended and completed, so that every town, and even village, should be placed on the iron web of communication with other parts of the country; otherwise they are completely isolated,—shut out from proper facilities of trade and commerce; and they must inevitably decline in prosperity and population.

It is surely the imperative duty of the Legislature to encourage and foster these undertakings, and to aid their legitimate progress in every way; and means should be taken to secure Acts of incorporation by steps more simple and inexpensive than at present.

Competing lines, with their ruinous contests, should be avoided and discouraged as much as possible, and an independent attitude should be assumed by railway promoters towards landholders; as, wherever railways traverse, the land in the vicinity is greatly increased in value; in fact, landholders have derived more pecuniary benefit from the introduction of railways than any other persons; therefore they should surrender their land at its fair market value; become cordial promoters, not greedy antagonists, bearing in mind that the land wanting the facilities of railway communication loses at least

one half its value. Greater circumspection is required in selecting and forming branch lines, the estimated cost of which should be properly and correctly ascertained, not left for contractors to work out, and then to be bought up at their valuation. The works should be substantially and economically carried out, specially adapted for the amount of traffic that is likely to pass over it, and suited to the wants of the country through which it passes.

If most of the stipulations here shadowed forth had been adopted as a rule, and which we expect has been the exception on the Irish lines, we should not have heard of the urgent appeals to the Government of the country to endeavour to relieve them of their pecuniary difficulties; and, indeed, I do not see what greater claim they have than many lines in this country similarly circumstanced: probably the latter would be only too happy to meet with a benignant, fatherly Government that would arrange and satisfy their debts, and place them in a more hopeful position for the future. After the completion of the works, one of the most important items in railway finance is the working expenses: the cost of working the Irish lines has been stated to vary from 37 to 75 per cent.; but it is said that two of the principal Irish lines cost only 43 per cent., which compares favourably with many of our English lines; if there are any lines whose working expenses exceed the sum named, the companies are conducting the traffic at an enormous sacrifice, requiring immediate revision and retrenchment, which it is just as possible to do on one line as upon another.

From the length of time many of the Irish lines have been constructed and in operation, it must fairly be supposed that the traffic of the country is pretty well developed (though there are complaints to the contrary), therefore the only chance of reaping proper returns on the capital invested must be contingent on an amalgamation of the lines, and a necessary reduction of the working expenses. It is strange that notwithstanding so many years the railway system of this country has been in operation, there is very little trustworthy data or statistics to enlighten and regulate companies or their officers in the working of them; and I think there ought to be full and complete statistics prepared by every company, to which every shareholder might have ready access, so that in every way the relative expenditure of each line might be compared, which would lead generally to a more economical and uniform rate of expenditure and system of management.

It is not sufficient that Government alone should be furnished with this information, as that too often is shelved in the dull recesses of their offices, or issued in an impermeable Blue Book; it should be published far and wide, and exposed to the broad light of day, so that every party interested may run and read, if he so desire it.

On looking over some statistics we had collected from about twenty-two of the principal lines of railway of this country, we find the working expenses to vary from 37 to 62 per cent., and this great difference ought not to exist, because the circumstances and conditions of the respective lines could not differ so much as to make the working expenses of one almost double that of the other; and in the instance of the Irish lines before mentioned, quite double the actual outlay of some lines. The extravagant expenditure in the construction of the works and other causes, are now unhappily producing their effects on the prosperity of the undertaking, and telling fearfully on the dividends; and although the Irish lines compare favourably in that respect with those of England, still they have been too expensively constructed to be worked with sufficient profit, and that is felt strongly through every artery, vein, and nerve of their system.

The average cost of the English system of railways amounts to the exorbitant sum of 34,638*l.* per mile, and there is only one of the Irish lines that has exceeded that amount, and that is the Dublin and Kingstown, which has cost 45,000*l.* per mile; the Newry and Enniskillen line cost 32,934*l.*; and the Cork and Passage, 24,478*l.*; but the great lines did not cost so much: the Great South-Western (Dublin to Cork, &c.), cost 21,398*l.* per mile; and the Midland and Great Western (Dublin to Galway, &c.), cost only 11,028*l.*) per mile, while other lines varied from 10,092*l.* to 21,398*l.*; and the lines from Londonderry to Enniskillen, cost only 8,449*l.*, and the Killarney Junction, 5,863*l.* per mile respectively.

The latter lines compare favourably with the cost of some of the continental lines. In Belgium, for instance, their system of railways averages about 8,800*l.* per mile; the Sardinia railways, from 7,000*l.* to 8,000*l.* per mile; but it has been the especial privilege of the United States to show us the way how to construct cheap railways. It is true they had no heavy Parliamentary expenses, or grasping landholders to deal with, and, so far as the cost goes, they have certainly set us the example how to make cheap railways.

In quoting from an official report of the State of New York, the average cost of constructing their single lines, with turn-outs, or sidings, at intervals, was only 7,448*l.* per mile; and for a mixed gauge (double and single) 9,483*l.* per mile, for the whole of the lines in that State, comprising a length of about 2,341 miles. While in other parts of the United States single lines have been constructed at a much cheaper rate per mile; for instance, the Maine Central, 109 miles long, cost only 2,306*l.* per mile; the Macon and Western, 102½ miles, cost only 3,237*l.*; the Madison and Indianopolis, 132 miles, cost 2,331*l.* per mile; and the "Nicaragua," 180 miles long, was estimated to cost 3,050*l.* per mile: the first line paid 13½ per cent., the second 12½ per cent., and the third 8¾ per cent dividends.

And our Canadian brethren, with the dread of the Grand Trunk and other lines before their eyes, have taken a leaf out of brother Jonathan's book, as the new line from Halifax to Riviere de Loupe has been estimated to cost only 7,000*l.* per mile, and we have no doubt will be well executed for the money.

Some of the Indian railways have also been cheaply executed: the Scinde has cost from 7,000*l.* to 8,000*l.* per mile; the Great East Indian, 8,500*l.* per mile; the Bombay, Baroda, and Central India, 6,144*l.* per mile; and others equally moderate in price,—and these lines have been carried out under Imperial guarantee and control. Some of these lines, executed under the direction of English engineers, have been well and substantially made; and it must not be inferred that, because we instance the American railways as models of cheapness, they are all that could be wished, and that they possess no defects. We know well there is great room for improvement; but what we would deprecate for Ireland is the heavy cost of construction of the English and their earlier lines, and, on the other hand, the cheapness of the American lines, at the sacrifice of utility. There must be some happy medium, some intermediate point of excellence and cost, between what are known as the European and the American systems,—a combination, or, it may be, various different combinations and adaptations, which will decrease working expenses in a greater ratio than they can possibly increase first cost.

The American system has opened out and developed the resources of a considerable extent of country in virtue of its cheapness, which would not have been possible if the English system of construction had been adopted, and a modification or adaptation of the two systems, avoiding the defects of the one and the great cost of the other, occasioned by elaborate works and other causes, might be usefully employed to complete the Irish system; indeed, it might be applied with advantage in completing the small arterial lines of even our English system.

To show the extravagant manner in which some details of our railway works have been conducted, even the "permanent" way or upper works of our lines have exceeded the entire cost of many of the American lines, and, indeed, of some of the Continental ones. They have varied in many instances from 4,500*l.* to 7,000*l.* per mile; and on the London and North-Western, with a 75 lb. rail, it cost 8,000*l.* per mile, while the elaborate and complicated works of the Great Western cost 9,000*l.* per mile.

But the American system consists of light works, no heavy cuttings or embankments; the gradient skims over the surface of the earth, just filling up and lowering slight inequalities; their gradients are necessarily short and chopped up, not long and continuous like ours, and they have ventured to ascend steeper gradients than with us, our steepest incline being the Bromsgrove Lickey, on the Midland line, which is 1 in 37½, while the Americans have had the boldness to mount inclines of 1 in 18 and 1 in 20 on the Virginian Central Railway.

The advantage and importance of steeper gradients is fast gaining ground in the opinion of engineers and scientific men, as evidenced recently by the construction of the Mont Cenis Railway, which forms an important link connecting the system that traverses France with Italy and the southern part of the Continent.

This line of railway passes along that extraordinary engineering work constructed by the fertile genius of Napoleon I., for military purposes; and in addition to the double line of rails, it has a central rail laid so as to be about 12 in. above the level of the outer rails, and on this central rail horizontal guide-wheels attached to the locomotive and carriages act on either side, so that they are enabled to pass very sharp curves, even of 44 yards radii, and with the additional bite or grip of the rail to ascend the steep incline from Lanslebourg to the summit, a distance of 6½ miles in length, with an inclination of 440 ft. per mile, or 1 in 12, and after passing along the summit level of 3 miles in length, skirting the lake Cenis, to descend gradients of 6¼ miles long to Molaretta, at the rate of 376 ft. per mile, or 1 in 14, and from Molaretta to Susa, of 6½ miles, or 1 in 15.

On the subject of inclines, just as the bulk of our principal lines are completed at an unprecedented cost, we are turning our attention to a cheaper system of railways with steeper gradients when it is almost too late to reap much advantage from them: if these gradients had been taken into consideration at an earlier period of the railway era, we probably should have heard less of railway panics, difficulties, and depression of railway securities.

There cannot be much doubt that one of the greatest drawbacks to the railway system of Ireland is the number of little petty companies that the Legislature has permitted to be organized to construct and conduct their management, with the inordinate number of *employés* to work the traffic of the respective lines. To manage their 1,838 miles of railway, they have thirty-five companies, and I suppose thirty-five staffs of officers of all kinds, from engineers-in-chief down to stokers and platelayers, with separate rolling stock and working plant; and it appears it has only just dawned upon them that, by a judicious system of amalgamation and consolidation, their boards of management may be considerably reduced, likewise their staff of officers, and other expenses.

To show that this can be easily accomplished, what has been done in this country in the shape of amalgamation, on the London and North-Western Railway, may be pointed out. They work satisfactorily 1,319½ miles; the Great Western, 1,311 miles; and the Midland and other lines have great lengths of railway under their management and control; the whole of these are satisfactorily worked and managed with success, and are not so large as to be beyond the power or scope of single boards of management. The reduction of boards of directors, and staffs, would at once add a considerable per-centage to some that already pay a dividend, and would possibly enable others to pay one that have hitherto been without, and would not detract one *iota* from a proper system of control and management, the reduced staff of officials would be fully employed, and the greatest available benefit derived from a constant and regular use of the rolling stock and plant.

To accomplish this object the Government, or new companies established under their auspices, might purchase the existing lines at the market value of the stock, form new boards of management and officials, and commence the working of them upon a new, improved, and economical system, regulating the trains according to the amount of the traffic, the density of the population, and the resources and necessities of the country.

It should not be said that railway companies rejected traffic, as is asserted of some Irish lines; their object ought to be to increase and develope it in every way, and convey it at those rates that would be remunerative to the shareholders; at the same time looking at them in a commercial point of view, we would not work a line at a loss, as it cannot be expected that *capitalists* should establish means of communication, and be compelled to work them *pro bono publico* at a dead sacrifice of the sinews of war, as the profitable employment of that precious commodity alone justifies its uses, and thereby increases the stability, power, and wealth of the nation.

On comparing the map of Ireland, published by the Royal Commission in 1838, and the present one with the lines of railway laid down upon it, it will be found there is very little deviation

from the Government plan as originally laid out, as the present lines are carried out almost identically with it, showing forcibly the advantages the country derived from the preliminary step taken on that occasion. It appears to us, on attentively studying that map, that the Irish lines of railway may be advantageously worked by dividing them into three districts, with boards of directors; and, taking Dublin as a centre and focus of traffic, with the lines radiating from it, I would divide them into the northern and eastern district, the northern and western district, and the southern district.

The northern and eastern district would comprise Dublin to Belfast, with the lines radiating from the latter town, and from Dundalk, and the Irish North-Western line, making a total length of about 622 miles; the northern and western district, comprising the Midland Great Western, and the lines to Meath and Clones, making a total length of about 490 miles; and the southern district, comprising the lines from Dublin to Wexford, Cork, Waterford, and Limerick, with the branch lines, and the lines radiating from the above and other towns, and making a total distance of about 741 miles or thereabouts.

The above divisions would be convenient to work, and much less in length than some of our English lines, that are worked with advantage and success; and our leviathan companies are not even satisfied with the great extent of railway now under their management, as they are adding annually to the lengths, by the construction of new works, or absorbing or amalgamating with other and competing lines.

If the Irish lines of railway, which have cost twenty-seven millions of money, can be bought up for 19,500,000*l.*, which is a sacrifice of nearly one-third of their first cost, and these lines now yield a revenue of 900,000*l.* per annum, and by a careful revision of management, the working expenses, be brought within reasonable limits, such as those of their two main lines, or to even say fifty per cent., for the sake of illustration, the Irish lines of railway ought to yield a very handsome revenue, something like 5*l.* 10s. per cent., and thus to make the Irish railway sought for as an investment.

But from the tone of the discussions at the half-yearly meetings of some of the principal lines, it appears the shareholders are fully alive to the value of their respective properties, as those that pay a moderate dividend are satisfied with things as they are, and would rest thankful; nevertheless not doubting that the Government would pay the full value of their property if they purchased; and it is only those lines that pay no dividend, and are hopelessly involved, that are ready to make heavy sacrifices to be rid of their troubles and responsibilities.

Of course, if a general plan of purchase and amalgamation be carried out, the same course of policy would have to be adopted as was pursued in South Wales under the new Road Act, where the Turnpike Road bonds were taken at their market value; but I have no doubt that the mere supposition or probability of Government purchasing the railways would have a sensible effect on the value of those securities, and considerably enhance the market-price.

Therefore, if any step be taken it should be done promptly; otherwise, from the improved prospects of trade and commerce, the gradual, slowly, but surely approaching period of returning confidence, with a fair harvest, a cheap rate of money, and a plethora of it in the coffers of our capitalists waiting but for the happy moment to employ it with advantage, safety, and success, a much higher price will be demanded for them; and though the shareholders may ask a small sum, comparatively, in the day of their difficulties and depression, this will not satisfy them, nor be accepted, when that period has passed away, and trade and commerce flourish once again, with all their attendant train of blessings in profusion, peace, and happiness.

NEW CORN EXCHANGE, NEWPORT, MONMOUTHSHIRE.—At a meeting of merchants and others interested in the formation of a corn exchange, it has been determined to form a limited liability company to raise a capital of 1,000*l.* in 200 shares of 5*l.* each. Mr. Hancorn, architect, has been requested to draw up a plan for the erection of a building, on a suitable site available for the purpose, at the back of the Steam-packet Inn, Old-green, and close to the High-street market-place. Several gentlemen have already promised to take shares.

THE BRITISH ASSOCIATION IN DUNDEE.

CONTINUING our notice of the proceedings of the Association, we come to the Section E, "Geography and Ethnology." After an address by the President of the Section, Sir Samuel Baker, a paper was read by Lieut. S. P. Oliver, R.A., descriptive of two proposed routes through Nicaragua for interoceanic communication between the Atlantic and Pacific. Various routes, he explained, had been proposed at intervals during the last twenty years, from the Tehuantepec route on the north to the Darien Canal and Humboldt's Atrato River route at the south. Of all these, the only line in operation was the railway between Panama and Aspinwall, successfully worked by an American company since 1855. Of the others, the only routes at all capable of competing with the Panama Railroad were those through Nicaragua. One of these, according to the paper, has been and is partially worked, though unsuccessfully, by the Transit Route *via* the River San Juan and the Lake. The other, soon likely to be carried out, is that proposed by Captain Pim, R.N., for a railway. The first of the two last-mentioned routes has been more than once advocated as suitable for water-communication—indeed, even for a ship canal—from the Atlantic to the Pacific, in 1850. The other has been only in want of sufficient capital to carry out the terms of the local Government concession. Both these routes, he said, necessarily follow the configuration of the valley through the elsewhere uninterrupted chain of impracticable Cordilleras. Lieut. Oliver then gave a description of the country surrounding the Nicaraguan Lakes. The difficulties of the navigation of the San Juan, against which the Transit Company have to contend, were exemplified on his ascent of the river after having passed the harbour of San Juan del Norte, or Greytown. The steamer they were in, drawing but eighteen inches, at last got aground, and could not be got off, so that they had to take to flat-bottomed boats and canoes. At the divergence of the San Juan with the main stream, or Colorado mouth of the river, about nineteen miles from Greytown, they observed the remains of a futile attempt to dam up the Colorado branch, in order to divert the stream down the San Juan branch—a stupendous undertaking. The low banks and marshes of the delta are such that the closing of the Colorado would cause the flooding of the surrounding country. Mr. Oliver thought that a more direct and easy route might be found, up the valley of the San Juan, across the mountains, to the tablelands of Costa Rica and San Jose. He hoped this would soon be effected, as Captain Pim proposed to explore this unknown river. From San Carlos, the regular transit route, as at present carried out, is by a paddle-steamer to Virgin Bay, sixty miles, then across the narrow neck of land, twelve miles, to San Juan del Sur, making the total length of this route, from ocean to ocean, 165 miles. On the 28th March, Mr. Oliver and his friends started off to follow the party under Mr. Collinson, which was cutting its way through the woods to the Rama River. They had been cutting a whole month, so that they had made considerable progress. The cutting, called by the Spaniards El Picquet, commenced at the very shore of the lake at San Miguelito; the pathway being bored out at intervals as required for the levelling and survey, did not make the tract a difficult one to follow, but for the first seven miles over savannah and jicaral they found it a better course to follow the regular cattle-route to the uttermost rancho. They, therefore, skirted the foot of some hills to the north through occasional thickets of bamboo, and halted first outside the denser forests at the last station, where water was procurable in a grove of stately coroso palm. The mosquitoes drove them nearly mad in the night; and at early daylight they were glad to be off, entering the cutting into the vast and hitherto impenetrable forests of the Musquito frontier. The path travelled through this part of the cutting was in many places very difficult for the oxen with cerones to pass, and frequent halts took place in order to shift the cerones and rest the beasts. On the 7th of May they came in sight of Captain Pim and his party, who had come in search of them. He accompanied them to their last camp, and at once despatched a pitpan full of provisions up to the party still left behind. They proceeded in canoe on the 8th down to the Rama station, where the bulk of the stores was deposited, and, leaving all rapids, found themselves in the navigable waters of the Rama River, reaching the village of Rama Indiana by night. Here Collinson returned to finish his survey; and Lieut. Oliver's presence being no longer required, he accompanied Captain Pim down the Rama to the Atlantic, proceeding on the 9th to Greytown by canoe. Of the engineering details of this line, he said, it was not his province to speak. Mr. Collinson's report would soon appear in full, when many erroneous ideas about the course passed over would be done away with. However, too much credit, he affirmed, could not be given to Mr. Collinson and Mr. Deering for the perseverance, energy, and courage with which they prosecuted their survey in the face of more than ordinary difficulties.

Admiral Ommanny asked as to the harbours that might be formed at the ends of the proposed line.

Lieut. Oliver said the engineering question was almost taken out of his hands; but he knew that two harbours were proposed by the engineers—one at Monkey Point, on the east coast, which would be well sheltered from the only dangerous winds that prevailed in that place; and the other at Realejo, on the west, at which there was a splendid bay, capable of sheltering a large fleet.

Subsequently, a paper "On the Physical Geography of Nicaragua," by Captain Maury, of the United States Navy, was read. It showed that without meteorological observations, which might be undertaken through the agency of the Academy of Science established by the late Emperor, and by the Geographical and Statistical Society of Mexico, none of the routes proposed could be adequately considered as to the respective merits. The author compared the Panama and Nicaragua routes, referring to the prevailing winds of the Pacific ocean, and concluded by expressing an opinion favourable to the Nicaraguan route as compared with that of Panama. A paper by Captain Bedford Pim, "On the Mining District of Chontales, Nicaragua," was afterwards read.

To the papers on Ethnology and the Races of Man we shall give attention elsewhere.

In the same section a Report of the Palestine Exploration Fund was read by Captain Wilson, R.E. This fund, as our readers may know, was commenced with a subscription of 500*l.* from Miss Burdett Coutts; which was followed by one of 100*l.* from the Royal Society, and 100*l.* from the Royal Geographical Society. The original object was that of a water-supply to the city of Jerusalem. Capt. Wilson's report stated the manner in which the 100*l.* voted by the British Association last year had been expended. The half of that sum had been used for general purposes, and the other half for instruments. The first sum had been applied towards paying the expenses of Lieut. Warren, R.E., who had charge of the second expedition sent out by the society. The results already obtained might be stated as follows:—The construction of a map, on a scale of 1 in. to a mile, of the highland districts of Judea, to the north-east and south-west of Jerusalem, of the Jordan valley for about 16 miles north of the Dead Sea, and of a large portion of the plains of Philistia. These surveys, combined with those made in 1865-66 by Wilson and Anderson, gave, for the first time, materials for a correct map of more than three-fourths of the Holy Land, and do much to remove the reproach that no trustworthy map existed of this most interesting country. The sum of 50*l.* granted for meteorological instruments has, under the superintendence of Mr. Glaisher, F.R.S., been expended in the purchase of four sets of standard instruments, which have been sent to different cities in Palestine; and the observations taken at these places will, with those taken at Jerusalem, form the basis of an accurate knowledge of the climate of Palestine, so remarkable in many respects.

Captain Wilson then read a detailed paper, giving an account of recent discoveries in and around the site of the Temple at Jerusalem. The writer first referred to the publication of the Ordnance Survey maps of Jerusalem, under the direction of Colonel Sir Henry James, among the most interesting and valuable of which were those of the Haram ash Sharif, the enclosure which contains within its walls the site of the Jewish Temple, and, as some hold, that of the Holy Sepulchre also. The paper gave a minute description of the present appearance of this piece of ground, and of the buildings still remaining upon its surface. With the exception of a deep hollow in front of the Golden Gate, a slight rise towards the north-west corner, and

the raised platform in the centre, the surface of the area is almost level, and has an elevation of 2,419 ft. above the sea. On the platform stands the well-known mosque Kubbat as Sakhra (Dome of the Rock), which contains the sacred rock from which Mahomet is said to have ascended to heaven. At the south-east corner the level surface is formed by the vaults known as Solomon's stables, the age of which has been much disputed. In connexion with the mass of masonry at the south-east angle, Lieut. Warren has made important discoveries (already referred to in the *Builder*). During the progress of the survey, a large arch connecting the Haram area with the causeway was discovered north of the Wailing-place. This arch is one of the most perfect and magnificent remains in the city. Much information was also obtained about the ancient water-supply, which was admirably arranged. The water was brought by an aqueduct from the pools of Solomon, and stored in rock-hewn cisterns, with connecting channels and arrangements for overflow, &c. Several of the cisterns were found to be of great size, ranging from 25 ft. to 50 ft. in height.

Lieut. Anderson next read a paper, entitled "Notes of a Reconnoissance of some portions of Palestine." Explorations on horseback were made in different directions over the valley of the Jordan; and, with a prismatic compass, the positions of all the important points were fixed by bearings taken to points previously determined. A map is to be prepared, showing all the important features that were seen as they travelled from Jerusalem, through Kefer Saba, to Cæsarea and Athlit, and southward along the plain of Sharon, including Ramleh, Beit Jebrin, Kebron, &c.

A long discussion followed, in which Sir Henry James, Sir John Bowring, and others took part.

The Rev. H. B. Tristram read a paper "On the districts of Palestine as yet imperfectly explored." He said there were many castles which, if visited, would throw great light upon the crusading districts. The place of the murder of John the Baptist and the Moab district were almost *terræ incognitæ*. Of the country of East Moab nothing whatever was known. He hoped that this section of the British Association would go on the principle that nothing was known while aught remained to be known.

In the same Section a paper was read by Mr. Cyril Graham on the "Explorations in Palestine to the east of the Jordan, and on future intended operations." After some opening observations, he said what was proposed was in the first place a trigonometrical survey on a large scale, in which every village, and every mound which marked the site of what was once a village, every glen, every spring, every feature, be it ever so small, of presumptive importance, would be delineated. He continued: "Then we want to know the materials of which old Hermon and the other mountains were composed, the fossil remains of ancient creatures which were embedded in their sides, the nature of the soils, all the trees of Lebanon, all the flowers of Carmel (which cover it like a carpet in the spring of the year), all the fishes of the Sea of Tiberias, and the phenomena of that most wonderful of basins, the Dead Sea. We want, too, a catalogue of the beasts and reptiles, in which the crocodile will appear; of the birds, of the butterflies and beetles, and the smaller entities of creation in all their varieties. In short, we wish that book rewritten, which has not been transmitted to this day, composed by a master of science nearly 3,000 years ago, that treated of plants, from the hyssop which is on the housetop, to the cedar which is upon Lebanon, and of the birds, and the beasts, and the creeping things, and the fishes of that land." He then spoke of the material that was to be expected from the country on the other side of the Jordan.

In Section F, "Economic Science and Statistics," after an address from the President of the Section, Mr. E. Grant Duff, M.P., who referred to the omission of teaching of the principles of Economic Science, from the Universities, to the questions connected with Trades Unions, and to the importance, not merely of "technical education," but of having, like Germany and Switzerland, a really good system of elementary and middle-class education as a foundation, the report of the Committee on Weights and Measures, and Coins, or so much of it as related to the first branch of the subject, was read by Professor Leone Levi; and a paper was read by Mr. James Yates, entitled "Reasons why the Office of Warden of the Standards should include Standard-weights and Measures of the Metric System, in addition to the Standards of the Imperial Weights and Measures." It appeared from the report that the method recommended to the Board of Trade by the Metric Committee of the Association, by the International Statistical Congress, and by Mr. Ewart's Committee of the House of Commons, and adopted in the Quarterly Account of Births, Deaths, and Marriages, of having items stated in the terms of the Metric as well as the Imperial System, had not been adopted by the Board of Trade, simply on the ground of "clerical difficulties." The mural standard, which had been the subject of so much care, both as to precision and material, the report said, was now completed. The two units now authorized by law—namely, the yard and the mètre—are shown together, for comparison, with their divisions, the yard in red and the mètre in blue. "By very careful observation," according to the Committee, "it has been found that the measures on this instrument are exact to within the two hundred and fiftieth part of an inch, or the tenth part of a millimètre." The standard is made of white glazed porcelain (porcelain being the material found to be least affected by changes of temperature), and it is fitted into a mahogany frame for suspension on to the walls of Custom Houses, Markets, Chambers of Commerce, and other public buildings.

The report then detailed the proceedings of the Conference with delegates from the Chambers of Commerce, when resolutions were passed in favour of the provision of standards of metric weights and measures, and of the stamping those in general use, so as to avoid the inconvenience which would prevent adoption of the system as permitted, and in favour of an introduction of the system into the public departments, as the Post-office and the Customs, and otherwise. It also gave particulars of the Conference in Paris held in connexion with the special exhibition which the Imperial Commission organized at the suggestion of the Committee and of the International Decimal Association. At that meeting M. Jacobi's report on weights and measures, which had been adopted by the organizing committee, was read. As regards nomenclature, that report was against any material change (and very rightly so); and it is of course equally opposed to the use of old names for new quantities. Neither did it favour the combination of the old and new systems, such as the use of the foot side by side with the mètre, even as a measure of transition. M. Jacobi's report, in conclusion, recommended the immediate tuition of the metric system in schools, and its use in statistical and other public documents. At the same conference there was an important discussion as to the state of the standards in France, and as to the exact correspondence of those at the Archives and the Conservatoire des Arts et Métiers. A commission being appointed to inquire and report, it was stated that on the 5th of October, 1863, a commission had been charged by the Ministry of Agriculture, Commerce, and Public Works to make a comparison, when the mètre at the Conservatoire was found to be ·00000329 more than a mètre. The statements were considered to be "highly satisfactory, as giving every guarantee of exactitude, and completely dispelling every doubt suggested on the subject." The commission appointed by the committee afterwards inspected the mètre and kilogram at the Archives and Conservatoire, and made a protocol signifying their satisfaction. The report read in the Section concluded by saying that though the introduction of the metric system throughout the Continent had been accelerated by the Conference, the use of the system in the United Kingdom, though legalized, had made little progress, or even in the education of the people; and the committee of the Section were of opinion, and recommended, that a bill should be introduced in Parliament to make the use of metric weights and measures compulsory after a given and not distant time. Mr. Yates's paper showed that metric weights and measures are now made in considerable quantities in London, Birmingham, and Sheffield; but the manufacturers apply in vain at the proper offices to have them tested. It may be useful here to mention that the report of the English Royal Commission declared the mètre to be of the length 39·37079 in., and that, on this, Dr. Craig, the author of an account of the metric system lately published at New York, which Mr. Yates says appears to be written with great skill and care, observes,—"More recent determinations reduce this somewhat; and the figures 39·37 accord very nearly with the average of the measurements made in this country [North America] and in England, and may be assumed as practically the exact truth." Mr. Yates's paper showed that besides the introduction and promulgation of the system by France, Belgium and Portugal had adopted it, that Germany and Russia were tending in the same direction, and that the United States had introduced the system into the Post-office and the Customs department. There are now, in the States, postal scales graduated in grams; whilst a law ordains that the half-ounce is to be considered equivalent to 15 grams.* Mr. Yates concluded with the recommendation that the recently appointed Standard Commissioners might be made the instruments of expediting the adoption of the metrical system in this country.

Mr. Edward Hall mentioned the discrepancies he had found to exist between the centimètres marked on a London 2-ft. rule, and the mural standard on the wall opposite the Senate in Paris of 1862 in mètres in the French department of the Exhibition. He also referred to the inconvenience and confusion which sometimes resulted from the French printers using commas for decimal marks, instead of periods, as in practice here.

Colonel Sykes said that wherever the decimal system had been introduced it had been found to save three-fourths or at least one-half of the labour. He believed that the discrepancy mentioned by Mr. Hall must have been owing to the measure he had applied having been affected by the atmosphere.

Mr. Hall said that the discrepancy he had found was too great to be accounted for on the supposition of Colonel Sykes.

Sir John Bowring spoke in favour of the decimal system, and said that he never knew of a Chinese boy making a mistake in an account, simply because he used his ten fingers, and their different joints, in his calculations.

Sir George Campbell said he believed that if they were to begin on philosophical principles to make a new multiplication-table, they would not use 10 but 12 as a multiple; and it might be for consideration whether, as they proposed to make a change, it should not be a more radical one than had been suggested.

Mr. Manockjee Cursetjee said that the adoption of the metric system would be particularly beneficial in India, where the weights varied every 200 miles.

Professor Levi said it was too late in the day to adopt 12 instead of 10 as a multiple. He regretted that Professor Piazzi Smyth should spend his time in looking at the Pyramids, and in trying to find out what was the use of the casket inside that tremendous amount of bricks. He thought all men of science should co-operate in endeavouring to procure the general adoption of the metric system.

Professor Rogers moved "That this Section recommend to the Committee on Recommendations the propriety of moving the Legislature on the necessity of introducing a knowledge of the metrical system into all schools which receive Government aid, and are under Government inspection, at as early a date as possible."

Sir John Bowring seconded the motion, which was unanimously adopted.

Decimal coinage was taken up on the following day: Professor Levi read so much of the Report of the Committee on the "Uniformity of Weights, Measures, and Coins" as related "to Coins" [it might better have been said to coins *and accounts*]; and Mr. F. P. Fellowes read a paper "On the various methods in which our Coinage may be decimalized; the advantages and disadvantages of each." The report, or portion of report, was confined to the statement of resolutions arrived at in Paris at the International Conferences lately held. Mr. Fellowes proposed a scheme making the farthing the unit. Sir John Bowring believed that the adoption of such a method would cause confusion in the monetary system both at home and abroad. He was of opinion that the sovereign should be the decimal unit of all coinage.

Professor Levi gave an outline of what had taken place as to coinage at the International Conference. The first proposal was for the gold

* How long is the stupid system of the English and French international postage-rates to be allowed to be in the rear of all other arrangements in the relations between the two countries? An ordinary letter between Dover and Calais, 21 miles, will cost 8d. postage; whilst the same letter would go, say, 700 miles or more in the United Kingdom, for 1d. The persistence in such a state of things is enough to make every friend of progress in either country lose all hope and heart.—ED.

five-franc piece as standard, but it was found to be objectionable as being too small and very costly of manufacture. It was considered that a 25-franc piece should form the unit, but as the present sovereign was equal to the value of 25 francs and 20 centimes, its value would require to be reduced, or the present coinage recalled. Such a step would seriously interfere with the commerce of the country. Lastly, the 10-franc piece, which happened to be equal to the value of 100 pence of the most recent form, and had been recommended, in the first instance, as a subsidiary coin only, and were it introduced, the people to be recommended to keep their accounts in ducats and pence, and, if successful, they should replace the pound by its present division. The two systems of the pound reduced, and the ducat of 10 francs, were essentially international, but with the difference that with the sovereign brought to 25 francs as a unit, calculations would still be rendered necessary for reducing international value from one system into another.

On the last day of meeting of the Section, a paper was read by Mr. P. H. Thoms, entitled "Observations on Community of Language, and Uniformity of Notation, Weights, Measures, and Coinage." The author, by examples, such as those of the Admirable Crichton, and other Scotchmen, who acquired distinction, and even held professorships on the Continent, showed the value of the Latin tongue as a means of communication, and that the growth of French as a prevailing language led to the conclusion, which was by no means to be regretted, that in two or three generations it would become the spoken language of the Continent generally. English would, however, supplant all the other languages of North and South America, and even of India, if not all Asia, besides Australia, New Zealand, and the islands of the Pacific. English would prevail over the southern portion of Africa, and French over the northern. The remainder of the paper was chiefly devoted to advocacy of the views put forward in reports and speeches that we have mentioned.

A not-unimportant paper, as connected with the subject of weights and measures, and we may say with the matter of the supply and purchase of certain building-materials, and entitled "The Measure and Value of Oats," was read by Mr. A. S. Wilson, in the same Section. It showed that, whereas, in various districts, corn was sold by one or other unit of weight, which had usually reference to a weight per bushel, the weight of the measure might differ enormously, because there was no legal or uniform way of filling the bushel. Assuming it is correct that the weight per bushel is an index of quantity of meal per grain of the corn, there should be one uniform way of filling the measure. The author of the paper had adopted the arrangement of a perforated filler placed one-fourth of an inch above the rim of the measure; and he stirred the corn through the holes, thus filling the measure equally all over, constantly from the same height, and without enclosing masses of air. Generally, this mode of filling increases the weight above that from the ordinary basket-filling, from three to eight pounds. Moreover, with certain sorts of oats, the weight generally increases each successive trial with the same sample. "The weight per bushel will thus increase, while the absolute weight diminishes." The paper concluded:—"It appears, therefore, to the writer, that a uniform corn-trade should be based on a uniform unit of weight, the quality or comparative value to be tested in the manner adopted in these experiments, and that the bushel should be wholly set aside."

THE DECAY OF STONE: ITS CAUSE AND PREVENTION.

In the Chemical Section of the British Association for the Advancement of Science, at the Dundee meeting, a paper on the decay of stone was read by Mr. John Spiller, of Woolwich, who has been for several years occupied at intervals in studying the causes of the decay, and in experimenting with such chemical re-agents as appeared to offer any promise of being usefully applied as means of prevention. We report the paper because of the peculiar importance of the subject, though it does not establish much conclusively. The author said:—At an early stage of the investigation I arrived at the conclusion that the corrosive action of sulphurous and sulphuric acids in the atmosphere, resulting from the combustion of coal fuel, operates, in large towns especially, in a destructive manner upon dolomite and the numerous class of limestones commonly employed in public buildings. This chemical action, aided no doubt by the simultaneous attack of carbonic acid and moisture, and in the winter season further supplemented by the disintegrating effects of frost, must, I conceive, furnish a sufficient explanation of all the facts observed. I would here remark that Dr. Angus Smith, Mr. Spence, and others, have already directed attention to the immense scale of production of these sulphur-acids, and have even quoted statistical data showing the extent or degree of pollution of the air from this cause in the manufacturing districts of Lancashire. When it is known that the best class of coal and coke contains usually one per cent. of sulphur, and that this proportion reaches a treble equivalent when stated in the form of the final oxidised product—hydrated sulphuric acid—it follows that a ton of coal of this high quality necessarily evolves during its combustion nearly 70 lb. of oil of vitriol. Here, then, is the origin of the sulphates which we find invariably present in the loosened crust of decayed stones, whether of calcareous or magnesian character. I have tested numerous samples of dolomite, Caen, Bath, and Portland stones fresh from the quarry, and in no instance found more than a trace of ready-formed sulphate, whereas scrapings taken from the decayed portions of the stone of the new Palace at Westminster are bitter to the taste, in consequence of the comparatively large amount of sulphate of magnesia formed during a few years' exposure to the sulphurous gases occurring in a metropolitan atmosphere. Caen stone from several buildings and localities, Portland stone, and even old faces of chalk cliff in the neighbourhood of Woolwich, were in like manner found to contain appreciable quantities of the sulphate of lime, having undoubtedly a similar origin. A close examination into the circumstances attending the decay of stone at the Houses of Parliament invariably shows an increased liability to corrosion under the projecting eaves and mouldings, and at such sheltered parts of the stone surfaces as are usually covered with soot and dust, and are in a position to retain for the longest period the moistures absorbed during a season of rain. The plain ashlars are throughout very much less affected than the buttresses, gablets, and other elaborately carved and highly ornamental portions of the work, which appear to be more assailable by reason of their relatively greater superficies. In many places the disintegrated stone exhibits white crystals of the sulphate of magnesia, which, alternately dissolving and recrystallising in the pores of the stone, may be conceived to exert a disruptive action sufficient to account for the scaling and fracture of the dolomite, which has been so often made the subject of complaint and regret. With the view of overcoming some of these difficulties, I submitted a plan to the Royal Commissioners charged with inquiring into the decay of stone at Westminster, in May, 1861, which consisted in the application to the cleaned surfaces of the stone of an aqueous solution of superphosphate of lime, a salt remarkable for its action in hardening the surfaces of chalk, Caen stone, or other calcareous building stone to which it may be applied either by brushing or immersion, and which acts upon the carbonate of lime in the stone, giving rise to the formation of Bödeker's salt (crystallized diphosphate of lime—2 CaO, HO PO-5 + 4 Aq.). My suggestion received a practical trial in a competition, to which other five candidates were admitted by the Right Hon. the Commissioner of Her Majesty's Works in April, 1864; and, in regard to the work executed on that occasion upon three faces of the Westminster Palace, I fearlessly await the Government report. In the meanwhile, another promising scheme for the treatment of the decayed stone, especially applicable to dolomite, has been submitted by me to the notice of the First Commissioner, but this new proposal has not yet been selected for trial. It consists in the employment of baryta conjointly with the hardening salt, so that a base may be presented which is endowed with the power of destroying the soluble sulphate of magnesia in the pores of the stone, forming with it the remarkably insoluble sulphate of baryta, and at the same time engaging the magnesia in one of its most difficultly soluble combinations. On a recent occasion I applied this process on a small scale to some Caen stone facings at St. John's Church, Woolwich, which were badly decayed. With reference to the application of the superphosphate to decayed Caen stone, I am able to refer to several successful examples of its use. In the year 1862 I applied the process upon some alms-houses forming part of Northfleet College, where the decay has been completely stopped. In 1864 I operated upon a window and buttress of St. John's Church, Woolwich; and in the following year the façade of the Grand Hotel, Brighton, was treated by my process. With respect to Portland stone, the earliest experiments were made at the Army Clothing Establishment, Woolwich, where in 1861 some decayed window-sills were treated, and with perfect success. I have some interesting results to record in connexion with the treatment of Portland stone, which serve to illustrate the increased hardness and strength, and the diminished rate and capacity of water absorption attending the employment of the superphosphate. Small cubes of Portland stone, each 1·3 in. dimension, were treated with the phosphate solution, and left to dry in the air; these were then subjected to gradually increasing pressure, until crushed between plates of lead in the American Testing Machine at the Royal Gun Factory; and the breaking weights of two precisely similar cubes of the native stone were at the same time carefully determined. The results were as follows:—

		Crushing weight.
I.	Stone, in original condition,	3,650 lb.
II.	Do., do.,	3,800 ,,
	Mean,	3,725
III.	Stone treated with superphosphate,	5,375 lb.
IV.	Do. do.	5,500 ,,
	Mean,	5,437

Thus acquiring an increased strength amounting almost to 50 per cent. The relative hardness of the stone before and after treatment could be readily ascertained by mutual friction of their surfaces, and also by scratching with a pointed instrument of copper, which metal proved to possess a degree of hardness intermediate between the original and treated Portland stones.

The porosity of the stone, as indicated by the amount of water absorbed, in equal intervals of time, proved to be greatly diminished in the case of the treated cubes. On this point several experiments were made, the stone being first weighed in the air-dried condition, and then immersed in distilled water at the temperature of sixty degrees Fahrenheit for the several periods named, and the increase of weight in each case noted:—

"Whit Bed," Portland.

	Original Stone. Grs.	Treated Stone. Grs.
Weight of Cube (dry)	1,421	1,420
Water absorbed in 5 min.	70	7
Do. do. 15 min.	91	8
Do. do. 30 min.	91	12
Do. do. 1 hour 30 min.	92	25

"Base Bed," Portland.

	Grs.	Grs.
Weight of Cube (dry)	1,291	1,385
Water absorbed in 5 min.	120	20
Do. do. 15 min.	122	33
Do. do. 30 min.	124	50
Do. do. 1 hour 30 min.	126	79

These results have been further controlled by other experiments, in which the same block was used in the original condition, and again after treatment with the superphosphate. It will be noticed that the advantage of the process is most clearly apparent in the case of the denser and more compact variety of Portland known as the "Whit Bed," which alone is employed for external building purposes. The other, the "Base Bed," is softer, and only fit for internal decoration, and its texture is so porous that in becoming saturated it absorbs nearly 10 per cent. of water. Samples of Mansfield dolomite absorbed amounts of water varying in different specimens from 6 to 8 per cent. After treatment by my process the degree of absorption was reduced one-half, and the results were even more favourable in the case of Caen stone. The cost of materials employed in the treatment of stone according to this plan is very trifling, and bears but a small proportion to the cost of labour necessarily expended upon the cleaning and preliminary preparation of the stone before the solution can be applied. One gallon of solution will cover about 300 ft. superficial, when two coatings are applied upon Caen or Portland stone. The superphosphate employed must not contain any appreciable amount of sulphuric acid, and the specific gravity of the solution, when diluted for use, should be about 1,100.

In the discussion that followed, the President of the Section (Professor Thomas Anderson) said:

"The decay of such magnificent buildings as the Houses of Parliament had been naturally regarded as a most

serious question, along with that of the prevention of further decay. Mr. Spiller's account of the results of his process were, therefore, peculiarly interesting to us, and the observations he had made was of considerable value, inasmuch as they afforded some explanation of the cause of the decay. They could see what was peculiar in the decay, and it showed them how important it was to bear that in mind. At the time when the erection of these buildings was commenced, immense care was bestowed in the selection of the stone; and the peculiar magnesian limestone was selected because it was found that all the buildings erected of it in the Middle Ages were in an entire state of preservation. However, it had been seen that these were not exposed to the atmosphere of large towns and other influences peculiar to such populous places, so that, when the same stone was built in London, it was found not to serve the same end. He was satisfied that the crystallization of the soluble salt on the pores of the stone subjected to wet and dry weather, was a great cause of the disintegration of the stone; but the results obtained by the application of Mr. Spiller's preparation, as illustrated by the several instances shown them that day, were of great importance, and he thought there was little doubt but that the process would meet with general approbation."

Mr. Spence said he thought it was the presence of sulphur amongst smoke that had the influence on the stone. In London they used a larger quantity of coal than in other cities, but then it was of a better quality than in other towns. In Manchester they used coal with 2 per cent. of sulphur; and as they consumed in that city 2,000,000 tons per year, they put daily 120 tons of sulphuric acid into the atmosphere. This was rather a fearful thing did they see it fully. Then the first shower that came brought down the acid—it lay under the cornices of the buildings; and he had no doubt the acid then commenced to seize on the stone, especially if there were any iron in it, and so began the disintegration. This was done, and the influence spread abroad. In speaking of the emission of sulphuric acid from smoke, he had, it was known, some peculiar opinions, and these he had published; he did not think the acid came mostly from the black smoke, which was the subject of the prosecutions. He thought that when the black smoke was cleared away they would have the acid stronger than at present—that the invisible smoke was by far most mischievous, as there was still as much sulphuric acid, and that, too, in a more concentrated form, for the carbon was all consumed. He hoped they would yet be able—but the time was, perhaps, distant—to carry off the acid in the towns' atmosphere, and he thought they would never be right till they got it carried away so far that it would never come near them.

Dr. Gilbert asked Mr. Spiller whether he had got, or thought it would be difficult to get, rid of all the sulphates in his preparation; and on being answered that he had not got a preparation without these, Dr. Gilbert remarked that a Frenchman had made a discovery which might do away with the difficulty.

Professor Ansted then made some remarks. He first referred to the different characteristics of stones, even before brought from the quarry, and then spoke as to the manner in which the softer classes were disintegrated by the atmosphere of different places, such as Oxford and London. There should, he held, be a careful selection of stones for building purposes; and his opinion was that were they to be preserved, the appliance of any material for that purpose should be made when the stones were taken from the quarry—that when decay once got in it could not be removed from a house—though the same means were sufficient on a stone in a laboratory—but that the stones then cracked and broke up time after time—so that perhaps preservation was impossible, and it might be well to give up the attempt, save on the stones of new buildings.

Mr. Spiller replied, and held that the opposite of Professor Ansted's views had been seen from the trial for six years of buildings in London. They had given results which removed from his experiments any appearance of a simple laboratory experiment, and indeed yielded them real practical benefits.

Mr. Ansell suggested that the best mode of getting the preparation put on the stone might be to enclose it in a chamber from which the atmosphere was excluded, and then introduce fluosilicic acid into the stone in a gaseous state.

The President, in a few closing remarks, expressed his opinion that the subject was of so very great importance, that it could not be too often considered. No doubt many of the methods suggested yet admitted of considerable improvement; but one of the advantages of these discussions was exemplified by the suggestion just made, and there was no doubt that the ideas might be turned to some account. A stone might be treated by a preparation, in the same way as timber was made impervious to water.

NOTES FROM FLORENCE.

ONE must make many walks in and around this city in order to see all that has been undertaken for public improvement. Besides the several new and broad streets, the promising quarter that is fast springing up on the northern side, we should follow the yet unfinished roads, excellent specimens of engineering, that are opening communications between the capital and various points of its vicinity; two of which are especially attractive, one skirting the Arno's right bank eastward, the other winding round the gentle ascent of the hills beyond the southern line of walls, that still remains intact, both these new highways promising to become favourite resorts, both offering the loveliest views of the luxuriant and populous Arno valley at every turn. The new enterprises for conferring substantial benefit upon this capital are numerous. A few days ago the Scottish Company of Leyden intimated to the Municipal Council its readiness to commence immediately the works for its much-desired aqueduct, which is to bring water from the Seine river into the heart of Florence; but the decision by that contracting company in favour of the system of metallic conduits along the whole extent meets with opposition from another party, who desire to see a construction in masonry. The Council has conceded the ground requisite for three large buildings, beyond three of the city's gates, destined for the lodgings of artizans and families in poor condition, with a moderate rate of rent, on the same method, generally speaking, as the several other establishments for lodgers of such class built during the last two or three years, either within or at short distances beyond the walls of Florence; in this last instance the concession being made to a company at whose head is a capitalist named Barlasina, and with which is connected the engineer undertaking to carry out the works, Signor Fiorucci, a young man of ability, who pledges himself to have these dwellings built on a plan quite his own, with baths for both sexes, illumination by gas, and a supply of water to each floor, from the time that the city itself shall have been secured this same benefit through means of the aqueduct. One among many things proposed is the formation of a public cemetery at the Certosa, that interesting old monastery, about three miles from Florence, whose inmates must of course share the fate of other such. At S. Miniato works are still going on for extending the area occupied by vaults and monuments; and it is generally thought that as a place of sepulchre the premises of that church no longer answer to the requirements of the enlarged city.

We have commended the principle acted upon in most public works here, of respect for the claims of whatever is historic or artistic, but have to regret one exception, however it may be defended as unavoidable, in the demolition, now in progress, of the arcades for family monuments, extending at an angle from the front of S. Maria Novella, to the entrance of a street that leads to the railway station, and thereby limiting that thoroughfare in a manner very inconvenient. Those monuments are of antiquity, at least as high as the Dominican Church itself, commenced about 1278, and offer interesting examples of the ancient Tuscan style, in the modes of entombment: under each of the centre arches, faced with the usual alternations of black and white marble, is a sarcophagus filling the lower part of the recess, adorned with heraldic devices, beside a central cross in relief, but without any sort of epitaphs. It is satisfactory, however, to see that the new works will not necessitate the destruction of the whole series, and that another species of decorative building in coloured marbles, ecclesiastical in style, is being raised along the narrower premises still left to the church in a line flanking the enlarged street. The modernization of a stately mansion, the architecture of Brunelleschi, on the Lung'-Arno (next door to the house of Alfieri), is a less excusable example of the renovating spirit that now provokes criticism, but for which private, not official, proprietorship is alone responsible. Since the S. Marco Convent was destined for its new appropriation as a museum of sacred art, the project has been advanced of uniting all the Florentine galleries in one great edifice, or rather cluster of edifices, to comprise those cloisters the extensive buildings of the "Accademia," and the royal stable, that occupy a wide space between the convent and the academic premises, and will no longer be wanted for their present purpose after the completion of the much statelier Scuderia, now almost ready, beyond the Porta Romana, on ground adjacent to the Boboli Gardens. When lately submitted to the Minister of Public Instruction, this project met with approval, and was referred for final decision to a committee, at whose head is the chief of the civil engineering department. One might be loath to see the favourite Mount of the Uffizi deprived of the art-treasures that have long attracted all Europe to its walls; but such concentration as is proposed would have its advantages, and many of the pictures, as well as sculptures, now in the Uffizi, might be much better placed as to light.

An esteemed antiquary, Professor Gamurrini, has been appointed to succeed to the late Professor Migliarini as "conservator" of ancient monuments in the Florence galleries. In the Uffizi our attention is excited by the addition, since last year, of a few paintings, on sacred subjects, from the earlier Italian schools. In the Mediæval museum at the "Pretorio" the cast of Michelangelo's "David" now occupies a permanent place at the centre of the largest and finest among the vaulted halls of that old Gothic building. The frescoes attributed to Giotto in the refectory of the S. Croce convent may now be seen without difficulty, though that great room has not (as intended) been made actually public, but is used as the magazine for official documents of a ministerial department now established on the premises.

The long history of projects and competitions for the Duomo façade is not yet at an end. We hear of another *expected* exhibition of designs, and of the probable preference for one that has lately attracted much notice, and is now seen in photograph at many shop-windows, by an engineer named Tasinio, who is, we understand, the son of a well-known engraver. Of rich and imposing effect, and conforming to the character of Italian Gothic in the church it is intended for, this designed façade terminates in a depressed gable at the centre, with lean-to roofs at the sides, and a projecting gallery carried along the whole extent of sky-line, with pointed canopies to the three portals, each adorned with sculptures in canopied niches, as the tympanum above the central door, a relief of the Assumption and colossal statues of Apostles at intervals between those three entrances; the whole receiving splendour from the profusion of sculpture and such elaborate details as to justify a very high estimate of probable expense. The thing has not yet been officially announced, but it is certain that a report of the *third* competition, and the designs then exhibited, is soon to appear from the pen of the secretary to the committee and judges. Many doubt the possibility of giving new impulse to the long-suspended subscription for this work, which had brought in about 100,000 francs, collected in weekly rates, for which persons of every class, rich and poor, had pledged themselves. Years have passed since this mode of collecting was abandoned, and the subscribers have been, in most cases, dissatisfied at finding their money left so long unproductive at the disposal of those who were doing nothing towards the object in view. Perhaps the chief obstacle exists in the but too manifest animosity against all that pertains to the ecclesiastical causes in the Italian mind, as now is the policy of the Italian Government.

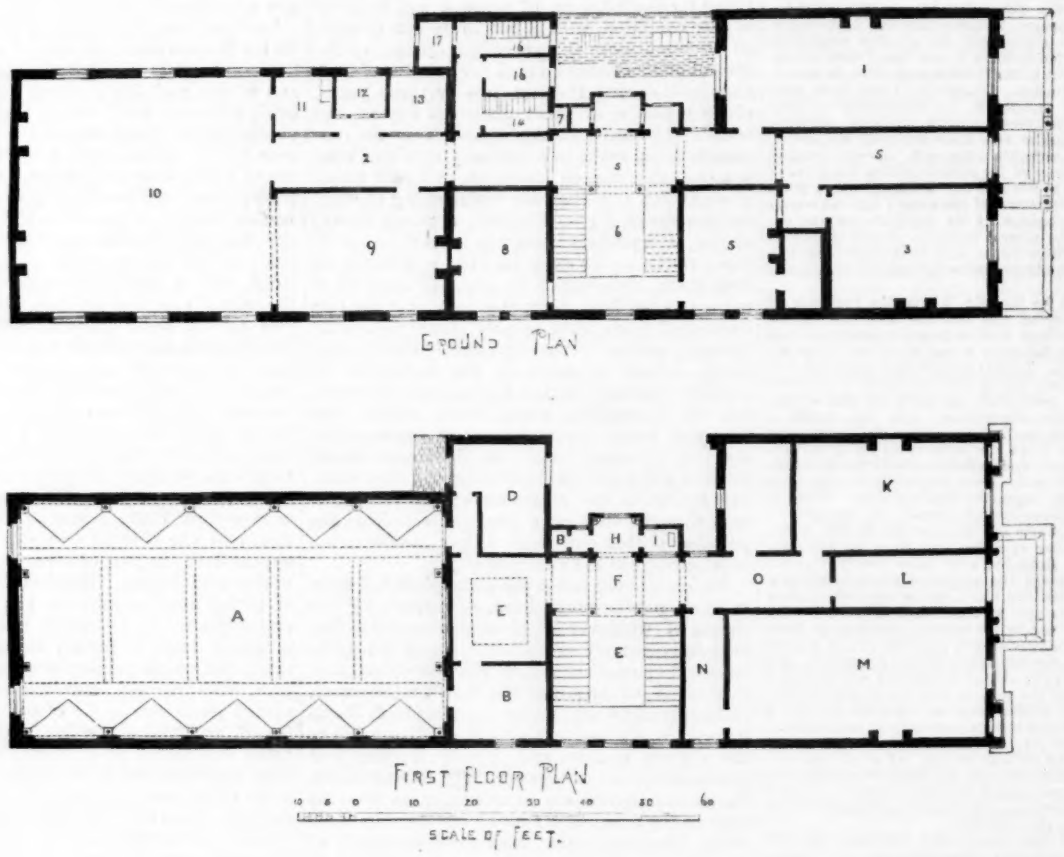
A society calling itself the "Italian Association for Instruction of the People" has offered a 5,000 francs prize for the best work as a theme analogous to that of the admirable "Self Help" by Smiles, with no prescribing of modes of treatment, but the requirement that the writer should efficiently show, not only the benefits of knowledge, but that "man can often do just as much as he wills." Another prize has been liberally offered by Adelaide Ristori (who lately gave two performances at the diurnal theatre here) for the best dramatic composition suited to the stage.

The restitution to Italy of all the art works removed by the Austrians from Venice, and of all, save one-twelfth, of the historic documents at the same time taken thence to Vienna, is an act of tardy justice we must rejoice to hear of. Such was the determination lately made by a committee at Milan, empowered to decide in this affair, and the small modicum reserved from the documents is confined to such as have reference to possessions still held by Austria south of the Alps. We hear from Cortova of a projected monument to a man of letters, Francisco Benedetti, native of that town, whose story is tragic, for he put an end to his existence at Pistoia in 1821.

OPENING OF THE DOCKS AT BARROW-IN-FURNESS.

So little was Barrow known quite recently, that after speaking of its progress in the *Builder*, we were asked, from Lancashire itself, where Barrow is. Its locality is the extreme north-west corner of Lancashire, near Ulverston, and facing an island known as Barrow Island, said by tradition to have been the burial-place of the Norse rovers, who, in the "good old times," carried fire and sword round the coasts of Great Britain. For centuries Barrow was a mere dull fishing village, and even ten years ago the entire population did not amount to 1,000 souls, and most of the "bread-winners" of the village were either sailors or fishers. Now it contains a population of nearly 20,000, and is a rapidly-increasing and prosperous town. It has recently been incorporated, and will soon, in all probability, be a flourishing seaport, and the seat of an immense shipbuilding and timber trade. The magic thing which has so rapidly transformed Barrow from stagnation to activity is the great *genius* of

THE MASONIC HALL AND CLUB BUILDINGS, DUBLIN.



modern days—iron. Hematite iron ore is found in immense quantities at Barrow; and some ten years ago Messrs. Schneider, Hannay, & Co. established works for smelting it there. Assisted by the *apropos* discoveries of Mr. Bessemer, Messrs. Schneider & Co. rapidly increased their business, yearly adding furnace to furnace, and speedily making an immense fortune. These iron-works soon gave employment to a large population, which rapidly increased year by year, until an active, prosperous town superseded the old quiet fishing village. The great natural advantages of Barrow soon attracted the attention of Mr. Ramsden, for several years the managing secretary of the Furness Railway, which was constructed expressly to develope the trading and commercial specialities of the district. Assisted and supported by the Dukes of Devonshire and Buccleuch—who are large local landowners—Mr. Ramsden's efforts were crowned with unprecedented success; and, fostered by such powerful influences,—regulated by rare commercial tact,—Barrow soon attained the rank and dignity of a town; and, when incorporated, Mr. Ramsden was elected the first mayor. In the meantime, Mr. Ramsden became a director of the railway, the Duke of Devonshire being chairman. Connected with every line of railway in the kingdom, Barrow soon attracted the notice of the Midland Railway directors, who resolved to run their line of steamers to Belfast from it, the Furness Railway Company having resolved to make a series of docks by damming up the channel between the town and old Barrow Island.

The plans for these docks were prepared by Messrs. M'Lean & Stillman, of London, engineers, Messrs. Brassey & Field being the contractors. The total cost is about 200,000*l*. In their entirety the Barrow Docks will extend from Crow's Nest Point to Cunninger Point, and be adapted for the accommodation of vessels of all sizes, while Walney Island,—sheltering them from the roughest weather,—will render them safe at all seasons of the year.

The dock, opened so auspiciously, is named after the Duke of Devonshire, and is 30 acres in extent. There is another dock of 33 acres, named after the Duke of Buccleuch, which is to be ready for business early in the ensuing year; while adjacent to it is a "timber pond," extending over an area of 35½ acres.

Every requisite for making the Barrow Docks useful has been provided by the promoters. Huge capstans and cranes, worked by hydraulic power, and manufactured by Sir William Armstrong, will open the dock-gates and hoist goods into the warehouses, which have a floorage accommodation of 17,000 yards. The quay space extends over 100 acres of ground, while the remaining portions of the island,—about 300 acres,—will afford sites for shipbuilding yards. In fact, Barrow Island will, in all probability, soon become the seat of an immense trade in iron shipbuilding, for the steel and iron can be procured on the spot from the Hematite Iron Company (Limited), who now carry on the business of Messrs. Schneider, Hannay & Co., and it is proposed to establish in connexion with it a manufactory for flax and cordage. Round the island are about 10 miles of sidings connected with the Furness Railway, so that ships can load and discharge with the greatest possible facility and despatch.

MASONIC HALL, DUBLIN.

THE accompanying engravings illustrate the new Masonic Hall and Club buildings which are in course of erection in Molesworth-street, Dublin. The front elevation is executed in Ancaster stone, and is divided into three stages: the lower one of the Doric order, the centre of the Ionic, and the upper of the Corinthian. The total height of the building from ground-line to top of pediment will be 73 ft. The whole of the club portion of the building is arranged on the ground-floor. The Grand Lodge room, which is to be on the first floor, will be 72 ft. long, 39 ft. wide, and 32 ft. high; the other portion of this floor is divided into Royal Arch Chapter, Libraries, with regalia and preparation rooms, which are approached by a flight of stone steps 6 ft. wide. The Prince Mason's Chapter and Grand Encampment will occupy the second floor.

The contract was undertaken by Mr. Michael Meade, of Dublin, at 7,600*l*.

The architect is Mr. Edward Holmes, of Birmingham and London, whose design was selected in public competition.*

REFERENCES.

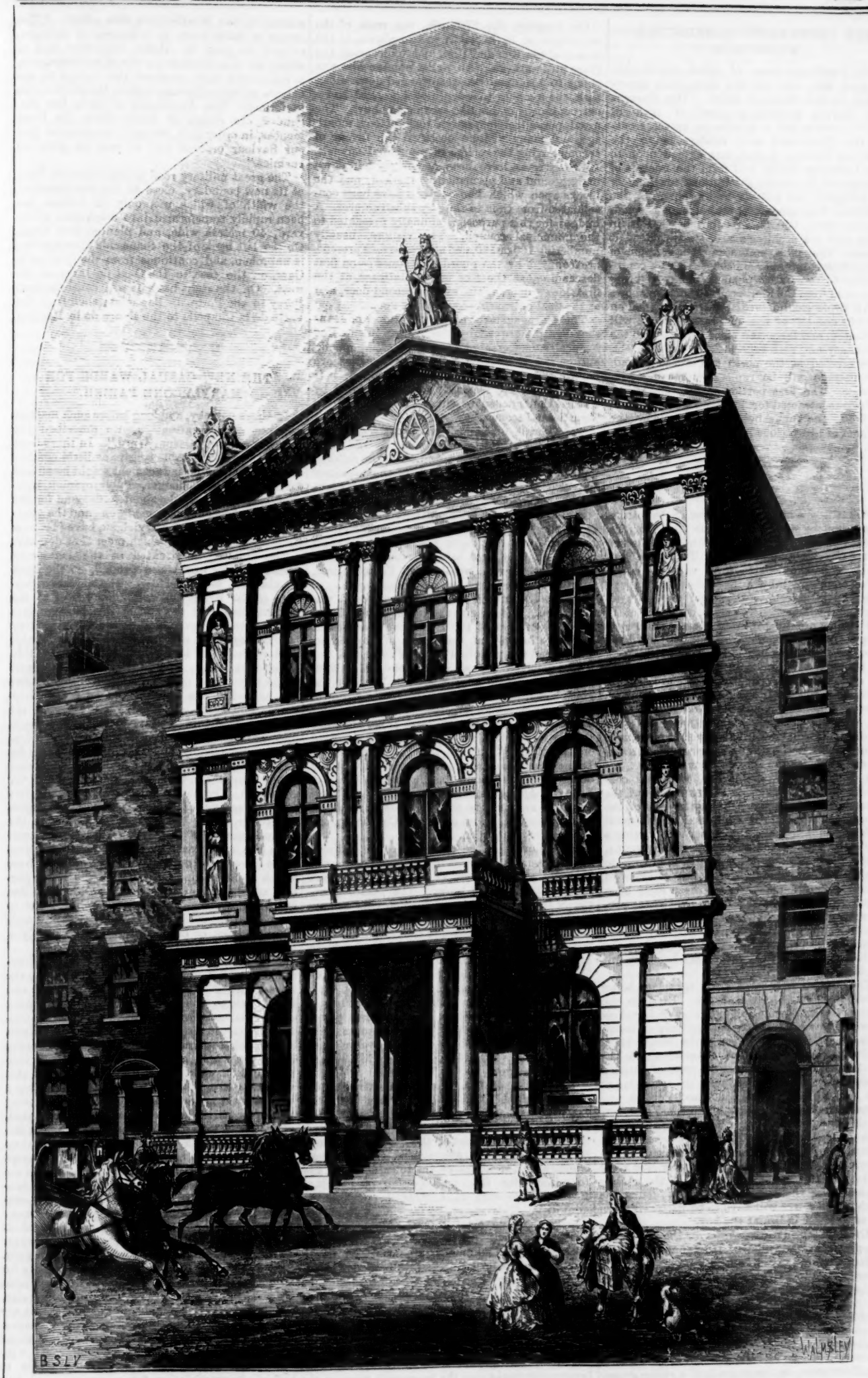
Ground Plan.

1. Coffee and Reading Room.
2. Corridor and Lobby.
3. Board-room.
4. Safe.
5. Secretary's Office.
6. Staircase.
7. Coal-lift.
8. Clerk's Office.
9. Dining-room.
10. Dining-hall.
11. Serving-room.
12. Wine-room.
13. China.
14. Back Stairs.
15. Hats and Cloaks.
16. To Dressing-room.
17. Lavatory.

First-floor Plan.

A. Grand Lodge Room.
B. Preparation Room.
C. Waiting-room.
D. Store for Paraphernalia.
E. Staircase.
F. Landing.
G. Coal-lift.
H. Lavatory.
I. W.-C.
J. Library of Superior Order.
K. Library.
L. Regalia and Preparation Room.
M. Royal Arch Chapter.
N. Porch.
O. Ante-room.

* Some extraordinary structures, it appears, are being raised for "the craft" in America. An illustrated American paper, containing four illustrations of the "Grand Masonic Celebration and Dedication of the New Masonic Temple, corner of Tremont and Boylston streets, Boston, Mass.," thus speaks of the edifice:—"Upon entering the building one is reminded of the descriptions which are preserved of those Egyptian temples, miles in circuit, with pillars 80 ft. high and lintels 40 ft. long, which were evidence of the architectural skill of an almost extinct race. The famous temples of Isis and Osiris are celebrated, and the Temple of Apollinopol is alluded to for its many peculiar features. The Egyptian architecture, with its cylindrical shafts enriched with rings of richest sculpture, crowned with bell-shaped capitals, wrought in the foliage of the palm or papyrus, embracing the caryatic order, was well adapted to give form to the metempsychosian creed of the people, and many of these marked features have been produced in this hall; while the painting by the artist, Mr. Haberstroh, who, having adorned an Egyptian Hall in Munich, came to this task with no inconsiderable experience, presents the novel combination of colours which forms the peculiarity of this style of decoration. The walls are finished with massive columns, having capitals enriched with leaves of the palm, the Nile lily, and human faces. The ceiling is divided into compartments by heavy beams above each column, which are decorated with various patterns, laid in with blue, red, orange, and green, in unbroken tints. The ceiling is tinted sky-blue, and studded with golden stars, and from the centre hangs a forty-eight light chandelier. The two main pillars at the east end of the hall, between which is the throne of the High Priest, form the most striking feature of this apartment. These pillars are ornamented with hieroglyphics, taken from the western face of the Obelisk Luxor, now standing in the Place de la Concorde, Paris, and refers to Rameses III. (Sesostris), B.C. 1550."



THE MASONIC HALL AND CLUB BUILDINGS, DUBLIN.——MR. EDWARD HOLMES, ARCHITECT.

THE FREEMASONS' ALMSHOUSES, MELBOURNE.

THE foundation-stone of these almshouses has been laid, with all the formalities appertaining to the Masonic order. The Government having granted a piece of land of about five acres and a quarter in extent, fronting the Punt-road and contiguous to the Wesleyan College, a plan was agreed upon to erect buildings which will form the nucleus of a number of charitable institutions for the poor and indigent, the widows and orphans of the brethren. The piece of ground is of a quadrangular form, 650 ft. in depth by 350 ft. in width, and the architects are Messrs. Reed & Barnes. The plan embraces the erection of twenty-four cottages or almshouses, and a centre building to form an orphan asylum. Entering the ground from the Punt-road, the design shows twelve triple semi-detached cottages ranged on the right and left of the quadrangle, which will be planted, and form the chief approach to the orphan asylum and superintendent's quarters, to be erected at the north end of the ground. Each cottage will be replete with every convenience. The first portion of the almshouses has been contracted for by Mr. Thomas Dalton, for 659*l.*, the funds being subscribed by the brethren of the various lodges of the order.

PARIS.

RECENT works have been carried on, to restore to its primitive state the elegant chapel of the ancient College of Beauvais, behind the Market of the Carmes and the Place Maubert. This chapel is a simple structure, without collaterals, terminated by a five-sided apsis, supported by solid counterforts, and pierced with lofty ogival windows. The spire, decorated at its base with an arcature of three lobes, has also been completely restored, and the building has been disengaged on the south side by demolishing an old house in the Rue Jean de Beauvais, which was attached to it. The chapel of the Beauvais College has become the property of the religious order of Dominicans, who have added a cloister and spacious buildings, where they are now installed, after having left the ancient monastery of the Carmes, in the Rue de Vaugirard, which was cleared away for the Rue de Rennes.

A remarkable fountain has been just constructed in the Avenue de l'Observatoire of the Luxembourg gardens, nearly on the site of the ancient gateway. It is composed of two great basins of Jura marble, the upper one having a *jet d'eau*. The parterres of the grand avenue, on the portions laid down in grass, have been furnished with handsome monolith columns of various coloured marbles; on these have been placed Florentine vases, in bronze. These parterres are to be surrounded by candelabra and lighted with gas. The iron gateway which separates the newly transformed garden from the ancient Avenue of the Observatory has been put in place.

The circular railway of Paris is at last being joined in so as to have no break. Between the Batignolles-Clichy station and that of Levallois Perret the works are being actively pursued. This connecting line passes under the Western Railway, crosses the Rue d'Asnières and the Boulevard Malesherbes, near its point of junction with the Boulevard Berthier; then, turning to the south, it cuts the Boulevard Pereire and joins into the old line of Auteuil and the rest of the circular railway. The passage of the line under the Boulevard Malesherbes is attended with much difficulty on account of the levels. In fact, the line passes over the great collecting sewer, but the crown of the arch is higher than the level of the rails. Thus the arch of the sewer will have to be flattened down so as to lower it 1m. at the key.

On the 25th inst. the works for the new water supply from the valley of La Vanne are to be adjudicated at the Hôtel-de-Ville of Paris. It is estimated that this valley, so rich in springs rising from chalky soil, can easily furnish daily to a maximum height, in Paris, of 230 ft., 22,000,000 gallons of water, equal in quality to that of the valleys of the Champagne now delivered into the Menilmontant reservoir. The reservoir for the new supply is to be constructed at Montrouge, on the summit of a rising ground not far from the Barrière Saint-Jacques. Like that of Menilmontant, the Montrouge reservoir will be arched over completely.

On Tuesday, the 27th ult., the roofs of the catacombs of Paris fell in in two places, at the corner of the Rue de l'Ulm, and underneath the Place du Panthéon. An artist painter who was going to his domicile was dragged down along with the footpath to a depth of 5 ft., and had a narrow escape of his life, escaping unhurt. The usual periodical inspection took place a month ago, and many visitors obtained the favour of accompanying the *cortége* of municipal officials. All the streets have been accurately laid down underground and permanently marked, and the blocks upon which houses stand have been consolidated from time to time by substructures. A budget for this purpose is annually presented to the municipal council. The visitors, usually numbering 100 or 120, and all the persons present, are counted by the guard four times;—on first descending, at the foot of the staircase, at the first lower door, again at the second door, and at the final entrance into daylight again.

The disengagement of the fine tower of Jean-sans-Peur, masqued by the houses in the Rue Française, has created such a sensation among antiquaries that the municipal authorities are determined not to leave the work undone; it is to be completely restored, and surmounted by a recreation garden or square, like that of the Tour Saint-Jacques.

The Church of Saint-Jean-Baptiste de Belleville, near the Buttes Chaumont, is but little known. It was commenced in 1854, and finished in 1859: it was the last work of the architect Lassus. It is seen from all quarters of Paris, being conspicuous from its two spires and three porches situated on an eminence. The town of Paris has lately gifted the nave with stained-glass windows. At right and left of the choir apsidal chapels are being decorated by M. Alphonse Chaignon, pupil of M. Viollet-le-Duc, for the Abbé Demures, curate of the parish.

On the 18th ult. a statue of Napoleon I. was uncovered. It is due to the chisel of the Count Payol, eldest son of the illustrious general who fought so bravely at the battle of Montereau, and reaped the principal share of the glory.

The principal statues of Napoleon I. hitherto erected in public places are—1, That of the Place Vendôme, by Lannoy, in 1808; 2, on the plains of Marengo, erected by the Sardinian Government, inaugurated 14th June, the anniversary of the battle; 3, a statue by Jouffroy, on the "place" of the town of Auxonne; 4, Lyons has a fine statue raised in 1854; 5, Cherbourg possesses one in the Place de l'Hôtel de Ville; 6, Ajaccio, inaugurated lately. Of these principal monuments to perpetuate the memory of Napoleon I., those of Lyons, Cherbourg, and Ajaccio are equestrian.

The following is the consumption in ordinary times of various articles in Paris:—There enter annually 90,052½ tons of flour. These gave about 273,155 lb. of bread. The potatoes consumed in Paris during an average year amount to 895,500 bushels. The poultry and game sold and consumed are classed as follows:—1,090,000 pigeons, 187,000 ducks, 2,535,000 bred rabbits, 1,869,000 fowls, 377,000 capons and hens, 590,000 turkeys, 155,000 partridges, 197,000 wild rabbits, 37,000 hares.

There have been sold for the value of 7,866,437 fr. (314,658*l.*), poultry and game; 5,085,503 fr. (203,420*l.*), of salt-water fish; 479,980 fr. (19,199*l.*), of fresh-water fish; 8,505,384 fr. (340,215*l.*), butter; 4,377,302 fr. (175,092*l.*), eggs. Total, 1,052,584*l.*

MM. Petit et Cie. have been entrusted by the municipal authorities of Paris with the execution of the prolongation of the Rue Réaumur, between the Place de la Bourse and the open space in front of the new Opera-house. It is said that the above firm, ordinary contractors for the works of the town of Paris, are to receive for this last section of the Rue Réaumur the sum of 1,120,000*l.*, payable by annuities. This street, 66 ft. wide, will absorb wholly the Rue Ménars, and cut through the Rues des Filles-Saint-Thomas, des Colonnes, de Richelieu, de Grammont, de Choiseul, de la Michodière, du Port Mahon, and Louis-le-Grand. The Jacobite convent of the Filles-Saint-Thomas was founded in 1742, by twenty nuns. Mention of the Filles-Saint-Thomas has revived an anecdote. A *danseuse* of the opera, Mdlle. Chameroy, died in 1812. The funeral *cortége* proceeded to Saint-Roch, the curate of which refused to admit the remains, stating that all comedians should be excommunicated; so the procession went to the church of the Filles-Saint-Thomas, the curate of which performed the service. A few days afterwards a communication, not signed, appeared in the *Moniteur*, to this effect. "The curate of Saint-Roch, in a moment of *déraison*, refused to pray for Mdlle. Chameroy, and to admit her into his church; one of his colleagues, a reasonable man, received the *cortége* in the church of Saint-Thomas, where the service was performed. The Archbishop of Paris has suspended the curate of Saint-Roch for three months, in order that he may be reminded that our Saviour ordered him to pray for even his enemies."

The great military road which encircles Paris at its new boundary, close to the fortifications, the width of which was only 12 mètres, has been rapidly transformed into a spacious boulevard, 40 mètres wide, and planted with trees. On the left bank of the Seine this thoroughfare is unbroken, and continues from the Quai de la Gare, on the east, to the Quai de Javel, on the west. On the right bank it will continue from Berey to the Porte de Bagnolet; then from the Porte de la Chapelle to the Route de la Revolte.

THE NEW CASUAL WARDS FOR MARYLEBONE PARISH.

IN times gone by, and long before such matters received general attention, we described the miseries of the "Casual Ward." In those days it was thought desirable to give as little comfort as possible, that no inducement might be offered for the return of the lodger. Public opinion, however, gradually brought about a demand for the provision of decent accommodation, and the guardians of the parish of Marylebone have just now completed some wards which meet that demand.

The building is situated at the north-east corner of the workhouse ground, at the back of the old Relief Offices. The entrance passage of the Relief Offices affords access to the new buildings; at the end of this passage is a general waiting-room, and adjoining is another for females only, next to which is the Female Bath-room. The bath-room is 12 ft. long, 9 ft. wide, 13 ft. high, and is lighted by windows in the upper part of the walls. These windows are hinged at the bottom, and open like hoppers. The baths, of which there are two, are made of Stourbridge clay, each in one piece, and, having a white glazed surface, present at all times a cleanly appearance. The water for these baths is heated by a stove, which, being in the same room, is under the supervision of the attendant. The stove consists of an upright cylinder, the casing of which is hollow and forms the boiler, while the fire is contained in the central portion of the cylinder; a pipe passes from the upper part of this boiler to a galvanized wrought-iron cistern fixed above, from which another pipe descends to the lower portion of the boiler; thus, by a well-known law, causing a continual circulation of hot water to the cistern, which is always ready with upwards of 100 gallons of boiling water for the supply of the two baths.

Adjoining this bath-room is the Female Sleeping Ward, 58 ft. long, 18 ft. wide, 15 ft. high to the lowest part of the sloping sides of the roof, and 22 ft. high to the apex. The roof is supported on circular cast-iron ribs, bolted to iron stanchions contained in the thickness of the walls, and which rest on solid stone bases. Running along the whole length of the room is a ventilator, 5 ft. wide. The upright sides of this ventilator are fitted with wide flaps, having a very simple apparatus for opening and closing when requisite, the top portion being glazed, afford slight to the apartment. On the floor immediately beneath this ventilator is a cast-iron grating covering a brick air-channel. This channel is supplied with fresh air, which passes from the outside of the building by covered channels running under the adjoining floors. It also contains hot-water pipes for heating the apartment in cold weather. The room is well lighted at night by two pendant star burners, the lowest parts of which are some 9 ft. above the floor. It will thus be seen that the arrangements for heating, ventilating, and lighting, are so arranged as to be entirely out of the reach of the inmates. Ranged down either side of the apartment are the sleeping bunks, affording accommodation for 44 women and 20 children. These bunks are generally 6 ft. 6 in. long, and 2 ft. 4 in. wide, but ten of them are made wider to afford accommodation for a woman and two children each. The boards forming the beds are so hung on pivots as to be capable of being turned up every day for the purpose of cleaning

the floor under. The head of the bed under the pillow is slightly raised, and is hinged separately, for the purpose of lifting and depositing the clothes of the sleeper; the clothes of each inmate being thus under his own protection. It should also be observed that the head of each bed is some 6 in. from the wall, and a current of air is consequently always free to pass under the bed and upwards towards the ventilators.

Scripture texts, the Lord's Prayer, and the Ten Commandments, are printed on the walls and ceilings, the red letters and blue tinted ground forming a pleasing decoration.

At the end of the room is a door leading through a lobby to the water-closets. These closets are constructed on the latrine principle, and seem well adapted for the purpose.

The arrangements for the accommodation of the males is identical with that described for the females, excepting that the shape of the bath-room stove is so modified as to allow the smoke and heat to pass by an iron flue-pipe through an adjacent disinfecting chamber. If on examination it is found requisite, the clothes of the casual are, whether male or female, hung up in this heated chamber, and well fumigated with sulphur.

On each side of the main buildings are ranged the working sheds, where the casual in the morning picks oakum or performs such other task as may be assigned him. These sheds are about 12 ft. wide and 9 ft. high, and are well lighted and ventilated by skylights.

The wards are constructed as "temporary buildings," by which means their cost is thrown upon the general London rate. They are formed of uprights of iron and wood, plastered internally, and covered with metal externally. The whole appears to be very creditable to the architect, Mr. Saxon Snell. The builders were Messrs. Crabb & Vaughan, and the total cost was about 1,300*l*.

It will not be out of place in our pages to describe the course now pursued in Marylebone with reference to Casuals.

Applicants for admission have to apply at the Police-station, Marylebone-lane, about a quarter of a mile from the Workhouse, for an order. This test the master does not impose upon a woman with a family, or a tired or aged applicant. On presenting the order at the Workhouse-gate, the casual is at once admitted; and, after certain information has been obtained from him and duly recorded, he is searched, and all prohibited articles taken from him or her, to be restored in the morning. The pipes, which are the chief articles found, form a curious collection. On two occasions only during the past two years were persons found with money concealed upon them, and each of them was taken before a magistrate and committed to prison. The clothing of the casuals is then examined, and, if it is clean, it is placed in the small box forming a portion of his bed already mentioned, and thus placed out of the reach of any of his companions, who might otherwise pilfer or change some of the garments. If the clothes are filthy, which is the case with two-thirds of the poor, they are placed in a disinfecting chamber, and are handed back in the morning thoroughly fumigated.

The casual undergoes the bath process, with a plentiful supply of hot and cold water, and soap at his command. He is then supplied with a warm woollen night-shirt, conducted to his bed, which consists of a mattress filled with coir, a flock pillow, and two rugs weighing 8 lb. for covering. The strictest silence is maintained in the wards, which are all night under the supervision of paid officers; and prayers are read every night in each ward by male and female Scripture readers, especially appointed and paid by the guardians for this purpose. The shirt and bed covering are disinfected in the morning, and are thus ready for another occupant.

At six o'clock a.m. in summer, and seven in winter, the casuals are ordered to work—the women employed in cleaning the wards or picking oakum. The strong, sturdy, idle men are selected and put to stone breaking—the others to oakum picking. The task of work prescribed by the guardians being, males, to break two bushels of stone or pick two pounds weight of oakum. It frequently happens that idle, disorderly fellows, well-known to the officers as professional casuals, will improperly linger over their work, and not have executed a reasonable half-hour's labour in the four hours. Such characters may be charged before the magistrate with wilfully neglecting to perform their allotted task of work; and, thanks to the assistance given by the magistrates at the Marylebone Police Court, this class has been pretty well weeded from this parish. Casuals who complain of being ill or unable to resume their journey, are examined by the medical officer, and if he thinks they are proper cases for the Workhouse Infirmary they are at once admitted. The breakfasts and suppers of the casuals consist of 6 oz. of bread, and one pint of gruel each meal; and they are permitted to take with them in the morning the fragments of bread collected from the sick and infirm wards, which previously found its way into the waste tub of the establishment. There is no limit to the number of times a casual may be admitted into the same ward. If he find no employment he may return again at night; and if he show a willingness to work, and cheerfully conform to the rules, an effort is made to provide him with some temporary employment.

It is the wish of the guardians of St. Marylebone that care should be taken to discriminate between the deserving houseless poor and the sturdy idle loafer; and while all is done to render the position of the former as comfortable as the law will allow, it is sought by a strict exaction of the labour test to drive the latter class from depending upon the pockets of the ratepayers for their nightly shelter. Mr. Douglas, the master, appears to devote himself with great earnestness to carrying out these views.

The total number that can be accommodated is about 100. We were not surprised to hear that the number of applicants has fallen off since decent conduct, silence, and other wholesome requirements have been insisted on. On Saturday nights the wards are always full,—a circumstance not difficult to understand, when it is remembered that no labour is required to be done on Sunday morning.

COMPETITIONS.

Bedfordshire Middle-Class Schools.—Twenty-nine sets of plans were originally submitted, and four were reserved for consideration and selection,—viz., those of Mr. F. Peck, London; Mr. John Usher, Bedford; Mr. John Day, Bedford; and Messrs. Mayhew & Calder, London. Ultimately, they selected Mr. Peck's design as the most suitable for the school buildings. Feeling a difficulty as to the claims of Mr. Usher and Mr. Day for the premium of 50*l*. for the design and plan the best of those rejected, they liberally paid them each a premium of 50*l*. For the fourth design they sent thanks.

Taunton.—The Taunton College School Company lately solicited designs from six architects. Mr. Giles, of Taunton, was the successful competitor, Messrs. Norton & Masey getting a premium of 50*l*., and the Messrs. Francis one of 25*l*.

Workhouse, St. Martin's-in-the-Fields, London. The Board of Guardians have selected the design by Mr. Cross, subject to the approval of the Poor Law Board. The building is to be erected at Wimbledon, and will provide accommodation for 201 males and 201 females, including 6 married couples and 40 permanent sick. The cost of the building is estimated not to exceed 28,430*l*., viz., main building, 24,680*l*.; infectious wards, 1,500*l*.; lodge and receiving ward, 700*l*.; boundary fences and gates, 1,550*l*.

A WALHALLA ON THE THAMES.

It was early urged in our pages that the Thames Embankment would afford admirable sites for the statues of such men as England might wish to honour, while they might be made to form one of the best and noblest adornments of what will be a national highway. Lord Winchelsea has recently given expression to the same suggestion, and it has been well received by the public. He proposes that the line of the Thames embankment be garnished with statues of the worthies of England—simply treated—in bronze; and he thinks that to conquer a place in such an array would be striven for in future, as now is the Victoria Cross. We do not think that. The man who deserves a statue seldom thinks or cares much about it; but such a setting forth of our good and great men would be an incentive to good deeds nevertheless.

A lady-correspondent, earnest in well doing, writes to us,—"Pray aid in obtaining statues of England's great men for the adornment of the parapet of the Thames Embankment. I like the notion immensely, and would fain be a 'great man' to go there myself." We hope, however, if the scheme be carried out, that it will not be absolutely necessary to be a great *man* to obtain a place in the Walhalla on the Thames, but that our great women will also find there fitting pedestals.

A SHEFFIELD CHAMBER OF INDUSTRY.

A CHAMBER of Industry has been formed at Sheffield,

"to look to the interest of both capital and labour, in order to bring them into closer union; to give advice in cases of dispute between employers and employed; to study the principles of political economy; and to examine the laws relating to capital and labour."

The business of the Chamber is conducted by an executive of thirteen members, including president, vice-president, secretary, and treasurer, to be elected by a general meeting of the body. The executive have issued an address explanatory of their objects, and in which they say:—

"The Sheffield Chamber of Industry owes it origin to a few working men, who have long witnessed with pain and regret the frequency of disputes between masters and workmen, and they believe the Chamber will have a tendency to bring them together for their mutual good. The executive believe that disputes often arise from mistaken notions of the relations of capital and labour, and they propose to inquire into the laws which regulate the production and distribution of wealth. They are also of opinion that the true interest of capital and labour is identical, and that, like manufacture and commerce, they are twin sisters, and ought ever to go hand in hand. It is intended to have lectures on political economy and other matters relating to capital and labour; also short essays, to be followed by discussion. Efforts will be made to secure the services of the ablest men of the age for these objects. The Chamber will use its influence to establish a Board of Arbitration and Conciliation, and until that is accomplished it will give its counsel, with the consent of both masters and men, to the settlement of trade disputes. . . . . Strikes and lockouts are evils prejudicial to employers, workmen, and the public, and it is hoped that all classes will come forward and prevent, as far as possible, their recurrence."

ACCIDENTS.

THE inquest on the body of the young man killed by the falling of a stone pillar in the Strand, as recently reported, has ended in a verdict, "That the deceased met his death by want of proper caution being used by the Messrs. Forster."

A dangerous and curious accident has occurred in Coleman-street, Bunhill-fields. It appears that near the Quaker burial-ground extensive excavations have been made to form the foundation of a large factory. The house adjoining has during the operations been shored up, but it seems that the excavations have weakened it, and the side wall fell into the excavation. In the room, of which the wall formed a side, a woman had lately been confined, and through the aperture she and her child, with all the furniture, were exposed. The frightened woman, however, was soon removed.

A man has been buried alive at Dalston. He was a labourer in the employ of Mr. Morley, a builder, and on Saturday last he and Robert Morley, his employer's son, were engaged in making a tunnel underneath the footpath and garden in front of a new villa, recently built at Navarino-road, Dalston. Robert Morley said, at the inquest, that the old man was told to make an open cutting in order to reach some pipes in connexion with the drainage, but he preferred to make a tunnel. The tunnel was made through a sandy soil 6 ft. below the surface of the earth, and it was 2½ ft. high. It was only intended to make it 5 ft. long, but the deceased while tunnelling made a mistake, missed the pipe, and carried the tunnel 8 ft. farther on. The coroner asked the witness why he was such a goose as to enter an unshored tunnel through sandy soil. The witness said that he trusted to Martin's experience. While they were both in the tunnel, 2½ ft. of the top of it suddenly gave way, and the deceased, who was at the end of it, was instantly buried alive. Witness was near the opening, and he had just time to get out of the way when the sand fell. It was half an hour before the body of the deceased could be dug out. He was then quite dead. The jury returned a verdict of accidental death.

The stand on the Racecourse at Mallow has fallen. The timber of the stand-house, which was densely crowded with people, was heard cracking, but the noise occasioned only a

momentary panic. A few minutes later, however, again the timber was heard cracking, but this time too late to allow the crowd to avail itself of the warning. Half of the stand sank to the ground, a distance of between 20 and 30 ft., together with the people on it. One boy sustained internal injuries, and cut and bruised heads, faces, lips, and arms were numerous. Hats were crushed, and coats and other garments torn; but no life was lost.

At Newbury, Berks, some men in the employ of Mr. Samuel Elliott, builder, were engaged in digging sand on Wash Common, when the ground fell in upon one of them, and killed him on the spot.

At Stroud a subscription has been commenced on behalf of the contractors, Messrs. Wall & Hook, for the rebuilding of the parish church, who suffered to the extent of about 700*l.* by the fire in their shed, which we have already reported. 100*l.* were raised at once. The destruction of all the prepared timber for the roofs will cause some delay in the rebuilding, as seasoned oak is difficult of obtainment, to say nothing of the time required to work it.

Three serious accidents in connexion with buildings have just taken place in Liverpool. While a man, his daughter, and another young person, who reside at No. 18, Johnson-street, were in the back part of the house, washing themselves, a portion of the building gave way and fell upon the three people, inflicting injuries of a very serious nature. The houses in the street are being taken down for corporation improvements. Another accident, resulting in the death of Mr. Bell, master joiner and builder, occurred at Bootle on the same morning. Mr. Bell was upon some scaffolding surrounding a new building at Bootle, when by some means he lost his footing, fell to the ground, and was so frightfully mutilated that he died shortly afterwards. A third accident has happened at the corner of Church and Paradise streets, where some houses are being taken down for the purpose of widening the street. Three men were engaged, on the first-floor of the building, in removing a wall, when another wall opposite to where they were employed gave way, carrying with it to the floor below the three men. Two of them are suffering from scalp wounds and other contusions, while the third is injured in the spine.

At the Parish Church, Leamington, a serious accident has occurred. A considerable portion of the scaffolding surrounding the new wing fell, and three of the workmen were buried in the *débris*. The men were at work on the scaffold, and fell from 80 ft. to 100 ft. There were only two large stones on the scaffold, and a hand-barrow of bricks. Under the scaffold where the poor fellows fell, was a heap of stones, and not only were they seriously injured by falling on these, but also by the planks and woodwork which came down upon them. Mr. Marriott, of Coventry, is the contractor of the works.

THE WINCHESTER DRAINAGE COMPETITION.

SIR,—Knowing that the pages of the *Builder* are always open to vindicate the rights of our profession, and also that several letters have been published in that journal within the last six or eight months relating to the Winchester Drainage Competition, I beg you will allow these few remarks to appear in your columns with regard to the latest transactions in this matter, viz., the special meeting of the Local Board on Tuesday, the 17th inst.

At that meeting it was resolved to adopt Mr. Botham's report; that is, to give the first premium of 150*l.* (which by the bye, is no premium at all, being included in the commission for carrying out the works) to Mr. Lemon, the author of No. 7 plan, and to withhold the second and third premiums on the miserable grounds that the other designs were not according to the printed particulars. So, in fact, they have got designs sent in, and the professional advice, of eleven gentlemen for—*nothing*, by simply offering three glittering baits; the first of which is a bubble which bursts directly it is laid hold of, and the other two turn out to be as ethereal as the first, and vanish in the end: a cheap (and decidedly nasty) way of getting professional advice.

Last week I saw by your paper that at Dorchester some board or body had offered a premium of 25*l.* for a church design, and, when several were sent in, had refused to give any premium at all.

Now, sir, are these facts to be established as precedents? Are young engineers, who are obliged to enter these competitions sometimes, to be ridden over rough-shod by these local boards and others, because they think they are out of the reach of punishment? Have they never thought that there is a moral obligation in these cases? and when they hold out offers for gentlemen to compete, are they not bound to see their part of the contract carried out as well as the competitors'? I would suggest to the Winchester Local Board that there are other trusts and duties entailed upon their office as important as that of saving the city the sum of 150*l.*

CIVIL ENGINEERS.

COWPER'S SUMMER HOUSE AT OLNEY.

ON making a recent visit to the village of Olney, in Buckinghamshire, I was grieved to find that the summer-house in which "The Task" was composed is fast relapsing into ruin and decay. This "nook" or "summer parlour," as the poet has differently designated it, is situated at the bottom of the garden attached to the house in which Cowper resided from 1767 to 1786, and is a small plain rustic building of lath and plaster, covered with red tiles, and run around the interior with a small bench. In this retreat, which is contiguous to the remains of the tree beneath whose shade the poet was wont to linger in the peaceful summer hours, he isolated himself from the social and domestic interruptions to his literary labour, and it is in obvious allusion to the delicious solitude which he here enjoyed that he writes in the "Task,"—

> "To me an unambitious mind content
> In the low vale of life that early felt
> A wish for ease and leisure, and ere long
> Found here that leisure and that ease I wish'd."

And again,—

> "Had I the choice of sublunary good,
> What could I wish that I possess not here?"

The walls are covered with initial signs and names,—a noble testimony to genius; and amongst others I may select those of Hugh Miller and Sir Walter Scott. The Throckmorton family have attended only to those spots associated with the memory of Cowper which are situated on their estate near Weston, and the summer-house, where one of the noblest poems that adorn the pages of English literature was composed, has fallen into the hands of a baker and confectioner, whose means are inadequate to the placing of the retreat in a proper state of repair. Is sensibility to the beautiful wholly extinct? J. CAMPBELL NUGENT.

SINGLE-SPAN CHURCHES.

SIR,—Let me add to the examples of single-span churches recently mentioned in the *Builder* a notable one in Bordeaux. I saw it a short time since while passing a few hours in that city. Divine service was being performed, and my observations were consequently very superficial, of necessity; but I was much struck by the contrast between the nave and choir—the former spacious and broad, without pillar, or much-projecting column; the latter having an aisle all round it, and separated from it by acutely pointed arches,—the former equally illuminated over its whole area, the latter broken up into a most effective combination of light and shade. The style of this church is Early Decorated throughout, except that over the south transept are two tall spires of elaborate pierced stonework, apparently of later date than the rest of the building.

Cannot our architects design churches for us which, while thoroughly ecclesiastical, would admit of every member of the congregation seeing and hearing the clergyman? Aisles too often prevent both. J. M. A.

BUILDING IN A LONDON GRAVEYARD.

SIR,—Close to Victoria Park Cemetery is a graveyard attached to the Globe-fields Wesleyan Chapel, Mile-end. It is no long time since this burial-ground was in tolerable condition with the usual array of head-stones, &c.; but about a year or eighteen months ago I observed that the stones were being gradually removed and packed in a corner, and the graves levelled. These stones were soon altogether taken away, and about a quarter of the graveyard was used as a cabbage-garden! On the walls of this burial-ground were painted the usual large figures, indicating to the visitors the latitude and longitude of the graves, but as visitors for dead relations in a cabbage-garden might be inconvenient and anomalous, these figures were soon obliterated, and the whole space used for the purpose of a sort of market-garden.

At the present time, sir, semi-detached villas are springing up in the place of the cabbages, several pairs of which are already erected. In digging out the foundations for these houses, the burial-ground was incised and excavated in a shocking manner. This "resting-place for the dead" is close to the embankment of the Great Eastern Railway; and, as I have to constantly pass and repass it, I have had the opportunity of observing the desecration from the beginning.

There was once a burial-ground attached to Spa-fields Chapel, Exmouth-street, Clerkenwell: recently the gravestones were removed, and a make-belief garden was planted, but the shrubs and plants could not live; so they were soon rooted out to make way for other transformations hidden from the public by a tall boarding, which, however, was not sufficiently perfect to prevent the fact of certain excavations having taken place in the graveyard being pretty generally known. S.

CONCRETE HOUSES IN THE METROPOLITAN DISTRICT.

SIR,—Being about to erect some concrete cottages, I should be glad if you or any of your readers would inform me whether there is anything in the Building Act to prohibit it; and, further, whether any concrete houses are known to have been built within the Metropolitan District? The District Surveyor tells me it cannot be allowed. BUILDER.

*** We are not aware that anything in the Building Act would prevent the erection of Concrete buildings within the Metropolitan district. The requirement that "the thickness of every stone wall in which the beds of masonry are not laid horizontally shall be one-third greater than the thickness prescribed in the rules" might possibly be held to apply. The Board of Works could settle this.

CHURCH DESIGN ABOUT SHEFFIELD.

SIR,—I think your "Commissioner" would do good service in reviewing the designs of the new churches that are springing up in and around Sheffield. Draughtsman's and carpenter's (architect) Gothic very much predominates to the exclusion of fine-art architecture, and I fear will not redound much to our credit in the pages of history.

One of the leading "Goths" admitted to me about two years ago that he knew little of Gothic architecture, and now he carries off all the prizes with the aid of experts from London offices, and thereby argues that the "bench" is the sure road to distinction and success. C. E.

THE NEW ENGLISH CHURCH OF BADEN-BADEN.

ON the 14th instant the church of All Saints', Baden-Baden, was solemnly opened. The edifice was designed by Mr. Thomas Wyatt, who furnished all the drawings gratis. It has spire and belfry. A stained-glass window, presented by Lord and Lady A. Loftus, decorates the east end. It was painted at Munich. The mosaic pavement, reredos, brass railings, and other ornaments, the pulpit of carved oak, the Bible and Books of Common Prayer for the reading-desk and altar, were also the contributions of Lady A. Loftus, and offered by her as a memorial of her eldest daughter, who died at Baden-Baden some years ago.

The Queen of Prussia, who takes great interest in the English Church, has contributed liberally towards the erection of this church. Her Royal Highness the Crown Princess of Prussia provides a font. The lectern, in the form of an eagle, carved in oak, with Gothic stand, having the four Evangelists at the four corners of the base, is the present of the Grand Duchess of Baden. His Royal Highness the Prince of Wales, during his late visit to Baden, took great interest in everything connected with this church, and sent the treasurer as a donation 1,000 francs.

RESTORATION OF ST. MARTIN'S CHURCH, EXETER

SIR,—A "Visitor" very justly reprehends the work that is going on at this church, situated as it is in the very Cathedral-close, *vis-à-vis* with the best original Norman and Decorated work.

He is a little hard upon the pointing, which nearly follows the old joints; but does not notice that the old bell-chamber windows have not had their tracery replaced, and some small quatre-

foil lights that have been scraped out to circles are left in mutilated condition, when a few pounds would have made them good. These mutilations "cleaned down" are more glaring than before; the "Visitor" does not notice them. What he says about the parapet and cornice is, I fear, too true.

Had he, however, entered the church he would have found that improvements have been already made in the chancel, under a very judicious architect, whose services, then gratuitous, should have been continued now; and assuredly the "abominations" noticed would never have existed. No one can interfere; for, as "there's a divinity doth hedge a king," so there is a deference due always to churchwardens. The "glorious west window" remains, as yet untouched; but a shallow porch, of very singular construction, is about, we fear, to rear its modern gable in front, and somewhat to the injury, of the fine old window.

It is only proper that *some one* should acknowledge the "Visitor's" just letter, and appreciate the good intentions and just censures of the writer. In doing this, I sign myself

AN EXONIAN,
And Member of the Architectural Society.

PROVINCIAL NEWS.

Yarmouth.—The new fish market and wharfs are now nearly completed. They are situated between Beeching's yard and the lower ferry, and are of considerable extent. The market is 750 ft. long by 40 ft. wide, with a landing wharf of the same width between it and the quay. The former is flagged throughout with Caithness stone, and the latter paved with granite pitching, the whole having a fall to the haven of 3 ft. The market is covered with a span roof, with queen-post trusses, resting on 148 iron pillars, which are set in York stone, embedded in concrete. The roof on the east side is lighted with thirty-six skylights, 10 ft. by 6 ft. each, the west front being open. Along the eastern side are offices for fish-salesmen and telegraph clerks, while in the rear are extensive warehouses, with an intervening space of 80 ft. wide for the storing of swills. These back premises communicate with the wharf by roadways, two of which intersect the covered market. The contracts for the wharf and market amounted to about 8,000*l.*, but as several additions, including the warehouses in the rear, were subsequently made, it is estimated that the entire cost will amount to about 12,000*l.* The works have been carried out by the corporation.

Stockbridge.—The foundation-stone of the new Parsonage-house has been laid. It is being built by Mr. Henry Reeves, of Rookley House, upon his own lands, expressly for the use of himself and family, consequent on his accepting the position of rector of the parish. The building will cost about 2,000*l.*

Eastbourne.—The extensive premises at the east end of Pevensey-road, which have been taken by the Eastbourne Royal Marine Baths and Laundry Company, and fitted up "for the purpose of supplying hot and cold sea and fresh-water bath accommodation, and also the means of washing linen and other things, for the visitors and residents, on the best and most approved scientific principles," have been formally opened for business. The building has been appropriated to the purposes of the company under the superintendence of Mr. Atkins, the engineer. The fittings of the bath-rooms are of porcelain, and the bath in one piece (Rufford & Finch's patent).

Torquay.—The foundation stone of a new harbour has been laid at Torquay by Miss Palk, daughter of Sir Laurence Palk, bart., lord of the manor, and M.P. for South Devon. The harbour is estimated to cost 37,000*l.* On the same day festivities were observed in Torquay in commemoration of Mr. L. H. Palk (son of Sir Laurence) attaining his majority. The plot of land in front of Ellacombe, Torquay, has been presented to the Local Board as a pleasure-ground for the public.

Maidstone.—The re-decoration of the ceiling of the Town-hall by Signor Galli is now completed. Originally the ceiling was painted in distemper instead of in oils, and the consequence was that the paint peeled off in large masses, as soon as the damp made its way to it. Signor Galli has materially changed his design, and he now guarantees that the work shall be durable. The cost is 100 guineas.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

THE first annual general meeting of this young Institution was held on Monday evening, the 23rd inst., in the hall attached to the offices. Mr. William Henshaw, the president of the Institution for this year, took the chair. The Secretary read a report, which said,—

"The claims that recommend this Institution to the support of the benevolent are many, but we can urge none more forcible than the fact that it represents an educated class, who are engaged in a trade where permanency of employ is very uncertain, and the occupation very sedentary, and who are in many cases unable to make any adequate provision for the necessities of old age, or to meet the requirements of occasional illness, family troubles, or loss of employ. We regret the absence of support by many employers in the trade, but we are buoyed up with the hope that, as our principles (non-union ones), are better known, we shall number them amongst our warmest supporters."

The receipts showed an amount to the Relief Fund of 409*l.* 8s. 6d., and to the Asylum Fund, 227*l.* 11s., making with interest on the banking account, a total amount of 638*l.* 13s. 4d.

The disbursements for the year amount to 161*l.* 1s. 11d.; and the balance at the bank, and in the hands of collectors, to 477*l.* 11s. 5d.

On the motion of Mr. Conder, seconded by Mr. Pritchard, the report was received and adopted.

Various other resolutions were moved and seconded by Messrs. Countney, Nightingale, Earle, and Dallen.

The Chairman considered that the present was an opportunity not to be lost by the builders' clerks. In the working of this their own Institution, they had not been interfered with. They had started it themselves; they had drawn up their own code of rules; they had had the entire management of it from the commencement, and save with the encouragement of their support, the employers had not interfered in the slightest degree with whatever they chose to do. From its commencement the objects of the Institution had been most ably advocated, and with what success he would leave the balance-sheet to tell. The Society was now well afloat, and it only needed the personal exertions of the clerks to keep it so. It would not do for them to stand aloof, and expect their employers and the trade to keep it up for them; it was such a one as met with their best wishes and entire sympathy, but he could assure them that the warmest support from without would be of no use unless equally balanced by the exertions of those personally interested in its welfare. The past year augured well for the future. They had started at a time, perhaps the worst in the annals of this century that could possibly have been chosen for such an object, and therefore he considered the success achieved all the more surprising. He wished particularly to call the attention of all present to Rule 5. That rule struck him forcibly the first time he read it. He admired the principle of it exceedingly. It gave the committee entire power, when any case of urgent distress is brought to their notice, of a builder's clerk, or his family, through accident, illness, or loss of employ (except through his own misconduct), to grant from the funds of the Institution a sum not exceeding 10*l.*; also in the case of the death of a builder's clerk leaving his family in destitute circumstances, to grant a sum not exceeding 5*l.* towards the expenses of his funeral; and a further gratuity not exceeding 10*l.* towards the assistance of his family. This he thought an admirable feature in the Institution, and it received his warmest support.

After some further observations from the chairman, a vote of thanks to Mr. Thomas Peto Ward, for his exertions in connexion with the Institution, was passed unanimously; and the chairman having been warmly thanked, the meeting broke up.

CHURCH-BUILDING NEWS.

Stoodleigh.—The new bells of the parish church have been inaugurated. Previous to their arrival the old ones, under the superintendence of Mr. J. M. Baker, were lowered from the bell-chamber. The date upon the old tenor is 1612, so that it had probably occupied its late position for a period of 255 years. The new frame-work, or the cage, in the bell-chamber, was made by Mr. James Osmond, of this place. The timber is oak; the frame bolted to the beams of the floor. The new peal, which is the gift of the lord of the manor, and patron of the living, Mr. Thomas Daniel, was manufactured by Messrs. Warner. The inscription on each bell, in addition to the maker's name, is Thomas Daniel, esq., donor and patron; John Greenslade, churchwarden. The peal is in the key of A natural, the tenor being the tonic, of course, and in six bells, the treble F sharp. The note of each successive bell was found to be correctly in tune. The ringers of the parishes of Oakford, Bampton, Huntsham, Washfield, and Stoodleigh tried them with "round-ringing," and Mr. C. A. W. Troyte, of Huntsham Court, assisted by some of his own ringers, and Mr. Boswell, foreman to Messrs. Warner, and who belongs to the "College Youths," rang the "Grandsires." The number of changes on six bells is 720, which should be rung in about twenty-five minutes. In the evening, the company, about 50 in number, had supper at the New Inn.

Wethersfield.—The church which has lately been erected at Blackmore End, in this parish, has been consecrated by the bishop of the diocese. The building has been long contemplated, but was commenced only sixteen months ago. It is built of red brick, the appearance of the interior being relieved by bands of black. The designs were by Mr. C. Buckeridge, of Oxford. The contract for building was taken by Mr. Runnacles, of Halstead. The edifice is built to accommodate 220 persons, and is seated with open benches, free and unappropriated. The pulpit and font are of stone. The total cost of the building, &c., will be about 1,200*l.*

Cartmel.—The restoration of the old parish church is completed. The extensive repairs have been in hand during the last four years. The galleries have been removed, and the old pews have given way to seats, made of oak. The lime and whitewash have been chipped off the facings of the stone. The western end of the church has had the ceiling renewed and the walls cemented; and nearly all the windows have been re-glazed.

Stoke.—The foundation-stone of Christ Church has been laid by Lady Bovil here. The site is in Waterloo-road. It will be a Gothic structure, and will consist of a nave, north and south aisles, and an apse at the east end, with tower and spire. At present it is only intended to build the nave, which, including the site, will cost about 3,000*l.* Over 2,000*l.* have been subscribed. The architect is Mr. Christian, of London, and the builders are Messrs. Swayne & Son, of Guildford.

Moreton (*Herefordshire*). — The parish church has been re-opened. The restoration was carried out, under the superintendence of Mr. W. H. Knight, of Cheltenham, by Messrs. Cullis & Collins, contractors, Tewkesbury. The tower is entirely new, as also is the porch, and the exterior walls have been scraped and pointed. New windows of stained glass, with Bath stone dressings, have been inserted. One of these is a three-light window in the east end of the chancel. The centre represents the Ascension, with the Agony in the Garden and the Bearing of the Cross on either side, while in the head of the window above is the dove, with the sacred monograms, "I.H.S." on the one side, and "A.O." on the other. The reredos consists of a triple arcade, composed of Bath stone and marble, the shafts dividing the compartments having floriated capitals of Derbyshire spar. In the central compartment is a cross of white marble, bearing the sacred monogram, "I.H.S.," and studded with carbuncles. On either side of the reredos are some symbolical designs in encaustic tiles (Godwin's), the chancel also being paved with plain tiles from the same manufactory. There is an open wooden roof, entirely new, to the chancel, in which a *sedilia* in Bath stone has been inserted on the north side, and the altar-rails are supported by light metal work. The pulpit is of Bath stone, the top part being in marble, as also are the shafts. The lectern is of carved oak, unpolished, and the reading-desk of pine wood, varnished. The pews are made on the open bench principle, but have doors to them: they are of pine wood, relieved with oaken panels, the wood used in the latter being taken from the old church. The whitewash has been scraped from the walls, which are now relieved by appropriate Scriptural mottoes in missal printing, while the plaster has been cleared away from the roof,—we are now speaking of the nave and body of the church,—and the old original oak exposed to view. The organ is a new instrument, and the gift, we believe, of the squire's wife, Mrs. Evans.

Killingworth.—The foundation stone of St. John's Church, Killingworth, has been laid. The style will be Early French Gothic, and the plan consists of nave, side aisles, chancel, organ chamber, vestry, north and south porches, tower, and spire. It is intended, however, to erect only the nave, chancel, south aisle, south porch, and vestry at present; leaving the north aisle, tower, and spire for erection at a future period. The building will be of stone from local quarries, the property of Mr. Punshon, with ornamental bands of red Carlisle stone. It will hold about 350 persons. The roof will be plastered between the timbers, and the passages and halls will be paved with coloured tiles. The contract price is about 1,762*l.* The builders are Messrs. T. Middlemiss, Son, & Stafford; and the architect, Mr. Bassett Keeling.

Stathern, Leicestershire.—The restoration of St. John's Church has been commenced. The works will comprise the removal of the present unsightly pews, opening out the tower-arch, new pulpit and benches, removal of

the organ, complete restoration of the chancel, heating, &c. The new woodwork will all be executed in oak. The works are being carried out from the designs and under the superintendence of Mr. R. W. Johnson, architect, of Melton Mowbray and Leicester.

Wolverhampton.—The memorial stone of the new Church of St. Jude, Wolverhampton, has been laid. The church is being put up on the north side of the Tettenhall Road, nearly equidistant between those of Tettenhall and St. Mark's respectively, and it will form the centre of a district having 2,000 inhabitants, to be made by the division of that of St. Mark's. The scheme originated with the Rev. A. B. Gould, the vicar of the last-named parish, who, upon laying it before Miss Stokes, a benevolent lady, residing in Wolverhampton, received her authority to draw upon her to the extent of 2,000*l.* in support of it, and also to take as a site for the church-buildings any land she possessed in the parish of which Mr. Gould is the vicar. The land taken in is about one acre in extent. The church is in the style of the thirteenth century, and consists of nave, north and south aisles, and chancel, vestry on south side of chancel, organ-chamber on north side of chancel, and a tower, through which is the principal entrance at the west end of south aisle. The height of the tower will be about 70 ft. The walls are faced with Codsall stone, and the dressings of Box Ground stone; the roof timbers stained and varnished. The seatings provide for 812 adults. The design has been prepared by Mr. Bidlake, of Wolverhampton, architect, under whose superintendence the works will be carried out. The contract has been taken by Mr. Nelson, of Dudley, at 4,250*l.*

Heworth.—The chief stone of a new church has been laid here. The land selected for the site of the church, and also a parsonage, the latter of which will likewise be built, consists of about an acre and a half of ground, situated at the entrance to the village, and immediately adjoining the road leading to Tang Hall. The church, which is to be designated the Holy Trinity, will cost in the erection upwards of 5,000*l.* Its style will be Early English, and it will have a nave and chancel, with a tower and spire. There will be a porch on the north side of the church, an entrance underneath the tower, and another entrance by the vestry. The church will have an open-timbered roof, the rafters of which will be stained and varnished; Westmoreland slates will be used for the covering in of the edifice. There are to be no side aisles, as the interior will be sheltered by one roof of 35 ft. 6 in. span, which will be the breadth of the church, and its length is to be 114 ft. Provision will be made for having an organ chamber underneath the tower. The floor of the nave will be flagged, but encaustic tiles will be employed in the paving of the chancel floor and the sanctuary. The nave and chancel walls will be pierced with two-light windows. The east end of the church will have three single-light windows surmounted by a cinquefoiled window, and the west wall will have four single-light windows of the same character; above which there will be a cinquefoiled window. All the windows will be filled in with cathedral glass, and have coloured margins. The sittings of the church will be open, and stained and varnished, and will accommodate 300 adults and 150 children. Mr. G. F. Jones, of York, is the architect; and the tenders of the following York tradesmen for the execution of the work were accepted, namely:—Mr. Joseph Keswick, mason and bricklayer; Mr. John Holmes, carpenter and joiner; Mr. Francis Rawling, plasterer; Mr. Richard Walker, plumber and glazier; and Mr. Thos. Wood, slater.

DISSENTING CHURCH-BUILDING NEWS.

Llanelly.—The memorial stone of a new Congregational chapel (being the fifth belonging to that body in the town) has been laid at the New Dock, Llanelly. The architect is Mr. John Humphreys, of Morriston, and the builder Mr. David Edwards, of Llanelly. The style of the erection is a mixed one. The dimensions over all are,—length, 58 ft. 3 in., and breadth, 43 ft. The height from the floor to the wall-plates is 28 ft., and to the centre of the pitch in the roof about 8 ft. more. The walls will be of stone from a neighbouring quarry, except the front, which is to be of dressed stone and rock work or poul work. On this side there will be six windows. The principal entrance is a large folding door in the centre of the front side; this leads into a porch, from whence doors on the right and left hands open into two side aisles, running from top to bottom of the chapel. The ceiling is a concave one, formed in plaster and with panel-work. A gallery, supported on iron pillars and girders, and the front, of cast iron, is to run round two sides of the end of the building. At the end, and facing the entrance, a platform will be erected at a convenient height from the ground, and in front of this a small reading-desk of polished Memel wood will be placed. The pews are to be of yellow pine and red Swede timber, the top being of polished mahogany, as well as the top of the gallery round the whole of the front. The windows behind the pulpit will be of enamelled glass, and the small lobby-windows are to be glazed in the same material. Seat accommodation is provided for about 600 persons, and it is estimated that the entire cost of the building will be about 1,400*l.*

Plaistow.—The memorial-stone of a new Independent chapel has been laid at Canning Town, Barking-road, Plaistow. The new building, which will cost 1,586*l.* 19s. 9d., is being erected by Mr. R. Stevens, of Poplar, from designs by Mr. J. W. Morris, of the same place. It will be a plain building, with platform pulpit, and vestry underneath, and the interior will be so arranged that galleries can be afterwards erected if necessary. Accommodation will be provided for 495 persons.

Eardisley, Hereford.—A new chapel for the Primitive Methodists has just been opened in this village. The edifice, which is in the Early English style, is built with brick and Bath stone dressings, open sittings, with rostrum set in a recess. The roof, which is open, is framed and braced, with boarding under slate. The woodwork is stained and varnished. Mr. J. H. Evins, of Hereford, was the architect.

Lower Cwmbran (Monmouthshire).—The foundation-stone of a new English Wesleyan chapel has been laid here, by Mrs. Bytheway, who officiated in the absence of Mrs. Greenway, of Glantorvaen House, Pontypool. The architect for the building is Mr. Samuel Hancorn, of Bristol and Newport, Monmouthshire; and the builder, Mr. Joseph Parfitt, of Cwmbran.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Doncaster.—The new church of St. Peter has been opened with great ceremony, and in the presence of large congregations. The church occupies the site of the old chapel in Princes-street. The style of architecture is First Pointed, and it is very simply treated. The material used in the work is brick, stone being sparingly introduced for the dressing of doors, windows, and other points of detail. Messrs. M. E. Hadfield & Son, of Sheffield, were the architects; Mr. Rodley, Sheffield, the contractor; Mr. Hayball, of the same place, executed the woodwork. The building has accommodation for 400 people.

Richmond, Yorkshire.—The foundation-stone of the new church of St. Joseph and St. Francis Xavier has been laid. The site selected is in close proximity to the old church. The plan consists of a nave, entered from an extended porch, such as may be seen at Fountains, and as existed at Byland, in this country. The nave is flanked by two aisles, giving a total width of 50 ft., and is terminated by a chancel of apsidal form, the total length being 101 ft. There are a side porch and two confessionals, whilst a sacristy, with a turret and upper chamber, terminates the eastern aisle. The aisles are separated from the nave by circular shafts of red stone and pointed arches, with a clearstory above of circular traceried windows. The roof is framed with arched principals, springing from stone corbels. The plans have been prepared by Mr. George Goldie, of London, the architect of the new Roman Catholic church at York; and the contractors are Mr. Smith, mason, and Mr. Naylor, of Richmond, builder. The cost of the whole will be under 3,000*l.*

Shipley.—The new chapel of St. Mary and St. Walburga, Shipley, has been opened for divine service. It is two years since the site, an acre in extent, in Victoria Park, was purchased of Mr. Cunliffe Kaye. It looks down on the mill and the village of Saltaire, and commands an extensive view of Airedale and its background of undulating hills. A Gothic presbytery has been erected, and between it and the present chapel there is an extensive plot of ground, intended for a better church at some future time, when the present chapel would be converted into schools. The chapel, which is in plain Gothic style, is 84 ft. by 30 ft., including a small sanctuary.

SCHOOL-BUILDING NEWS.

Hawsker.—Hitherto the extensive township of Hawsker-cum-Stainsacre has been ill-provided with a school-house and place for religious worship. Some time since the farmers and landowners resolved to make an effort to raise a suitable building, and their appeal for aid was so promptly responded to, that the erection was soon commenced, and it has now been opened. The school is conveniently situated, in a central part of the township, about three-quarters of a mile from the village of Hawsker. It is built of stone, supplied gratuitously from one of Mrs. Cholmley's quarries. The site, including playground, has been granted by the lord of the manor and Mr. Moorsome. The cost of the building, including a house for the teacher, is 550*l.*; and about 150*l.* are still needed to start the institution free from debt. The design of the building was furnished by Mr. E. Smales, architect, and the sole contractor for the erection was Mr. Wood, of Malton. The room is capable of accommodating upwards of 200 people.

Hucknall-under-Huthwaite.—The foundation-stone of a new school for the parish of Hucknall-under-Huthwaite, a large village situated between Sutton-in-Ashfield and Alfreton, has been laid by the Dowager Countess Carnarvon. The site of the building is upon a declivity near the road leading from Hucknall to Blackwell. Mr. C. J. Neale, of High Oakham, is the architect. The principal room in the building will be used as a chapel of ease for the use of the village, which possesses no church. Accommodation will be provided for about 300 children of both sexes. The girls' and infants' school will be in dimensions 35 ft. by 22 ft.; and the boys' room, 32 ft. by 20 ft. There will also be a class-room 22 ft. by 12 ft. It is contemplated to erect two teachers' residences if the funds permit. At present the contemplated expenditure is about 900*l.*

Hanley.—The chief stone of a new ragged school has been laid here. Mr. Snaith, the borough surveyor, who is a member of the committee, prepared the necessary plans without charge, and he has designed a building which will cost about 600*l.* It will consist of one large room, with a moveable partition, two class-rooms, and a gallery, and will accommodate about 400 scholars.

Penzance.—The memorial stone of new Wesleyan day and Sunday schools has been laid close to the enlarged chapel in Chapel-street, the front abutting on the thoroughfare to the quay, and having a second approach for the infants' school from Voundervour-lane. They will be built from the plans of Mr. John Trounson, of Penzance, architect, who was the successful competitor among five for a premium of 10*l.* Messrs. Philip Thomas & Son are the builders. The cost when complete will be about 1,500*l.* The elevation in Chapel-street shows a building of dressed hammer-raised granite, with granite ashlar dressings. This frontage will be 33 ft. high, to the parapet of cut granite, and will have six circular-headed windows and a square porch, surmounted by a bell-turret 12 ft. above the parapet. The carpenters who have contracted for their portion of the work are Messrs. Hill & Jenkin. Mr. James is clerk of the works.

STAINED GLASS.

St. Peter's, Quernmore.—The east window of St. Peter's Church, Quernmore, Lancashire, has lately been filled with coloured glass under somewhat singular circumstances. Mr. Garnett, late M.P. for Lancaster, having been led to visit Cannes, in the south of France, for three successive seasons, assented to a proposal made to him in the spring of last year to join with the chaplain and another layman in providing a coloured window for the English church at Cannes, which was to be enlarged. An order was given in London, and the window was finished and sent out by the *Fairy Vision* for Marseilles, in October last. The ship foundered almost within sight of port, on one of the

dangerous sandbanks off the mouth of the Rhone. The window was insured and an order was sent to London for another, which in due time arrived, and was fixed in the church. The unfortunate *Fairy Vision*, at the bottom of the Mediterranean, was sold to a Greek, who set to work to recover the lost cargo, and while Mr. Garnett was at Hyeres in the spring of this year, the window was fished up and sold by auction at Marseilles. He bought it and sent it home, not much the worse for its five months' dip in the sea, and it is now in Quernmore Church. The window represents leading events in Gospel history.

Books Received.

Mushrooms and Toadstools: How to distinguish easily the Differences between Edible and Poisonous Fungi. By WORTHINGTON G. SMITH. London: Hardwicke, Piccadilly. 1867.

Mr. W. G. SMITH is a devoted and enthusiastic student of the Fungus tribe. For many years he has devoted every moment of his leisure to it; and some time ago he received the gold medal of the Royal Horticultural Society for his drawings and dissections of fungi. By means of the little book before us, and two large sheets containing figures, one of twenty-nine edible and the other of thirty-one poisonous species, drawn the natural size, and coloured from living specimens, he seeks, while preventing disasters, to make known the large number of fungi that may be pleasurably eaten. He invites his readers to partake of the bountiful feast spread all over the country for those who care to partake. We must, nevertheless, inculcate care. The knowledge generally possessed regarding the immense fungus tribe of this country is embraced in the words mushroom and toadstool.

If we take the mushroom type of fungus as an example, we have, it appears, some 600 species, all possessing a certain general similitude of form. This has caused many to look upon fungi in common as equivocal productions, difficult or impossible to distinguish as permanent species; but when the study is once entered upon in earnest, the student will soon perceive that the species, as a rule, are marked with great distinctness and permanency, rendering the recognition of most of them as certain as any species of flowering plant. Mr. W. G. Smith has done a good work well. He brought to the task an accurate pencil as well as special knowledge.

Examples of Bridges and Viaducts: from the Contract Working Drawings, or Admeasurements. By W. DAVIS HASKOLL. Second edition. London: Lockwood & Co. 1867.

THIS edition of Mr. Haskoll's "Examples of Bridges and Viaducts" has the advantage of containing more than 500 estimates of over-rail and under-rail bridges, and some sensible observations on the practice of setting out works, and the value of practical knowledge to the engineer. It is a very valuable volume, and may be added usefully to the library of every young engineer. It will be very useful, too, in the colonies.

We will take an item of information from his pages. He has found the average number of bricks laid by one man in a day of ten hours.

1,600 in abutments and foundations.
1,400 in arches of large span.
1,100 in 18-in. walls, with joints struck.
1,000 in 14-in. walls, with joints struck.

He notes, too, that 12 tons of Blue Lias quick lime will make about 47 cubic yards of first-class mortar, 53 cubic yards of second-class mortar, and 81 cubic yards of concrete.

VARIORUM.

"JOURNAL of the Transactions of the Victoria Institute, or Philosophical Society of Great Britain. 1867" (Hardwicke). "Annual Address to the Victoria Institute, May 27th, 1867. By J. Reddie, Hon. Sec." (Hardwicke). Although the members of the Victoria Institute are obliged to reason on restricted principles, no member being admissible who is not a believer in the Bible, and, in fact, at least a nominal Christian, the subjects discussed are of great interest, and the mode of discussion liberal, and free from anything like bigotry. The society have a "devil's advocate," as they call him, in Mr. Warington, who defends the ultra-liberal side of various questions, and so gives piquancy and life to discussions which would read rather flatly if all the speakers were on one side.——"The Civil Service Geography. By the late L. M. Dalrymple Spence, revised by T. Gray, assistant secretary, Board of Trade" (Lockwood). "Not to make too fine a point of it," this little volume is a crammer, but a very good one. We have heard of a machine by means of which live geese could be stuffed to the throat, and so in time made fit for the roasting to which they were destined. If any machine will stuff Civil Service candidates with grains of geography, and fit them thus far for their examination, this little manual will do it. There are members of the Government, too, of pretty high rank, who are said to be not by any means posted up in their geography: here they will find the pure grain winnowed from all the chaff, and available at any sly moment. As a help to children at school the book is by no means unsuitable.——"Report of the various Proceedings taken by the London Trades Council and the Conference of Amalgamated Trades in reference to the Royal Commission on Trades Unions and other subjects in connexion therewith" (Kenny, printer, Parker-street, Little Queen-street). This is a clear and business-like report of proceedings connected with the trades-union question. Amongst the recorded matter is that relating to the endeavour to obtain a bill to secure the funds of trades-unions from dishonest officials. A temporary bill was introduced into Parliament, but thrown out. No doubt the whole subject of trades unions will come before Parliament next session, and some protection will be granted in this respect.——*Country Life* is a periodical that many people living in the country will value, treating as it does of the farm, the garden, the house, and so forth. "A North Northamptonshire Rector," by the way, who has commenced some jottings in it, when he quotes a line known to every one in this fashion,—"Some one has said that 'man made the town, and God the country,'"* does not give a good impression as to the precision of his knowledge.——Hardwicke's *Science Gossip* progresses capitally. It is invaluable for young naturalists, indeed to all living in the country.——Mr. Tegg has published a new edition of Wright's "Eton Greek Grammar," revised by the Rev. John Massie, M.A. ——And from the same publisher comes a fresh issue of Strutt's "Sports and Pastimes of the People of England," with Hone's Index: an amusing and valuable book. A really new edition, properly edited and added to, is wanted. ——Mr. Wyld, always prompt, has just issued a new Map of Abyssinia, which will be of interest at the present moment. It is well marked with numerous names of places, and appended is an interesting section of the land levels of this mountainous district of country, from the Gulf of Aden to Agaumeder.

Miscellanea.

OUR INDIAN RAILWAYS.—A leading article in the *Times of India*, of the 19th of August last, relates to serious defects in the management and execution of the railway works in India. The writer says:—"There can no longer be any evasion of the truth that faulty construction is one of the blots of our railway system—the shingle embankment at the Sukkee Nullah, the seven suspected bridges within seventy-five miles between Sheagaum and Budnaira, and the utter destruction of the great viaduct on the Bhore Ghaut, are indications of a general flaw which more or less seems to pervade all railway constructions in India." He complains of the operation of the sub-contract system, and the construction of embankments formed of "shingle," arches of "rubble masonry," and piers composed mainly of rubbish called "concrete." "Happily," he remarks, "some check is already being given to this system. The contract on the Eastern Bengal line has, we believe, been quite regular and satisfactory, and the same may be said regarding the progress already made with the Delhi line. It is imperative that a stop should be put to the illusory and expensive procedure which is inseparable from the practice of amending contracts."

* "God made the country, and man made the town."
Cowper: "The Task."

The Roman writer, Varro, substituting "divine nature" for "God," had said the same thing seventy years before Christ.

THE CO-OPERATIVE PRINCIPLE IN AMERICA.—Co-operative associations are multiplying among the working men of New York. Two co-operative building societies have been formed, and it is proposed to establish a co-operative savings-bank, also a store.

THE LATE M. HEISER, ARCHITECT.—M. Heiser, architect of the Austrian department in the Paris Exhibition, has died. He was only forty-four years of age. M. Heiser received the cross of the Legion d'Honneur, on the 1st of last July, from Napoleon.

THE TREE THAT GROWS GREASE AND TALLOW. In China there grows a tree known as the Grease Tree. It is said that large forests of this vegetable lubricant are to be found there, and they form the source of a considerable local traffic. This tree not very long ago was imported into India, and it is said that the experiment of cultivating it there has proved quite successful. Dr. Jameson, a chemist in the Punjaub, has prepared hundredweights of grease from this particular tree, and has forwarded on trial a portion of it to the Punjaub railway, to have its qualities tested as a lubricant. The grease thus obtained, it is said, forms an excellent tallow, burning with a clear, brilliant, and white light, emitting no unpleasant odour or smoke.

THE ATMOSPHERE OF THE UNDERGROUND RAILWAY.—In a letter by the secretary to the vestries of St. Marylebone and St. Pancras the writer says:—It has been suggested that openings might be made at several points in the Marylebone and Euston roads, where important thoroughfares cross this line of road, by means of handsome and ornamental hollow columns, which should be connected with the tunnels, and which should support street lamps similar in principle and fashion to the lamps at each end of the new street in the Borough. Of course such works could only be undertaken by or with the consent of your vestry, and I am, therefore, desired to ascertain whether the vestry would be prepared to assent." On the reassembling of the vestries the subject will be considered and determined upon.

TRADITIONAL RELIC OF THE SLAYER OF THE GREAT SNAKE OF SLINGSBY.—It has been found necessary to pull down one of the few ancient churches now remaining in Yorkshire—the church of All Saints, Slingsby—in consequence of its decayed condition. The church formerly belonged to the abbot and convent of Whitby. The old church contained a cross-legged effigy of one of the Wyvills, who, tradition and the Dodsworth MSS. say, slew the famous snake of Slingsby, which is reputed to have been so terrible that the highway to Malton was diverted one mile to the south, to miss the snake's lair. In the tomb below the effigy a skeleton was found, the bony hand of which wore a splendid and massive gold ring, having the death's head and cross-bones picked out in coloured enamel. The tomb, the skeleton, and the effigy have been preserved, and will be restored to the chancel of a Norman church, which is to be reared on the old site, of which the foundation-stone has just been laid. From below the foundations of the old church coins of the Hanse Towns Confederation (twelfth century) were dug up.

THE ROCHDALE PIONEERS.—The annual return has been issued of the statements rendered by industrial and provident societies in England, registered under the Act of 1863. 240 neglected to send a statement of the business of the year 1866; 436 complied with the requirements of the Act. The business carried on is that of dealers in provisions, some associations also supplying drapery goods, or boots, or both. The number of members of the 436 societies had reached 173,423 at the close of the year 1866. The shares are commonly 1*l.* each. At the end of the year the amount of share capital was 1,048,096*l.*, and of loan capital, 118,023*l.*; the trade liabilities, 334,561*l.*; the assets and property, 1,009,849*l.*; and the cash in hand, 192,803*l.* The Rochdale "Equitable Pioneers," established in 1844, still take the lead. This association had at the end of the year 1866, 6,246 members, and a share capital of 97,489*l.*; grocery and provisions sold in the year to the amount of 249,122*l.*, cash, realised a profit of 31,931*l.* There is a quarterly audit by members. The profits were disposed of thus:—For interest, 3,823*l.*; dividend on the amount of purchases made at the shop, 25,829*l.*; education, 681*l.*; reserve fund, 252*l.*; for depreciation of fixed stock, 1,197*l.*; charities, 165*l.*

ARCHITECTURE: UNIVERSITY COLLEGE, LONDON.—Professor Hayter Lewis has issued his programme. The first term in each course will commence on October 8th.

GLOUCESTER CATHEDRAL.—Mr. J. Roddis, of Birmingham, has completed the last of a series of figures, thirty-three in number, for the chapel of St. Andrew, in Gloucester Cathedral, at present being restored under the direction of Mr. Gambier Parry and Mr. Scott, R.A.

JOHNSTONE, SCOTLAND.—The chief stone of a public hall has been laid here. The cost is estimated at nearly 3,000*l*. The building, the site of which is in Ludovic-square, is intended for a public library and reading-room, and will contain a hall for public lectures. The walls are a few feet above ground.

TRANSPARENT DOOR-PLATES.—Messrs. Drury & Westrup have patented a new knocker, which includes an arrangement by means of which the number of the house or name of occupant can be seen at night. A small opening is cut in the door to fit a plate of ground-glass at the top of the knocker, on which the number or name can be written; a light in the hall would, of course, be necessary to make it obvious at night. For the design of the knocker at present made we can say nothing very flattering; but the transparent part may be found useful by physicians and others, and for houses in the suburbs which have a plot of garden in front, as the number can be seen from a distance.

THE BRADFORD NEW TOWN-HALL.—"There is a very general opinion," says the local *Observer*, "that the town council has made a great mistake in deciding to build their new offices on the west side of Chapel-lane. The objection is manifold. It is urged that the site is inadequate, unsuitable, expensive, and required for other purposes. Further, that we ought not to be satisfied with 'offices,' but should go in for a town-hall as pretentious at least as those of Leeds and Halifax, and that on the site chosen such a building is not possible. Also, that a better site in all respects, less costly, equally convenient, and more commodious can be found, upon which temporary offices may be erected if thought advisable, and a grand town-hall eventually."

THE CHAPELS, BEBINGTON.—At the monthly meeting of the Bebington Burial Board, it appeared from the proceedings of the former meeting that the second premium for the designs for the chapels, &c., had been awarded to Mr. Thomas Holmes, Tranmere, and that the tender of Mr. John Dobson, Rock Ferry, had been accepted for the carrying out of the designs of Mr. Hamilton, in accordance with the plans selected for the first premium. It having been stated that some remarks had been made respecting a disparity which it was said existed between the specification for which tenders had been invited and the original one submitted by Mr. Hamilton, the surveyor had been instructed to examine them and report, which he now did to the effect that the two specifications were substantially the same, any small alterations made being principally explanatory, and that in almost every instance their tendency was to increase the cost.

THE RAILWAY CUT ACROSS AMERICA.—The last, the longest, and by far the most costly of the excavations along the line of the Central Pacific Railway is the great tunnel which has just been completed. Of this tunnel while in progress we have already spoken. It is 1,660 ft. in length, and was begun at the east portal on the 16th of September, and on the west portal on the 20th of September last, and the work upon it has therefore occupied about a year. The material which had to be drilled and blasted was granite of the hardest grain. Advantage was taken of a depression in the centre, and a working shaft of 159 ft. was sunk so as to present four working faces. The average rate of progress with powder was about one foot per day to each face, or from 20 ft. to 30 ft. per week in all. In March last the company accepted the services of an experimenter in nitro-glycerine, which article was manufactured on the spot, and the average was increased to nearly 50 ft. per week. The workmen, principally Chinamen, laboured in three gangs for eight hours each, and proved very serviceable in this kind of work. At times the consumption of powder reached 400 kegs per day. The Pacific Railroad is thus making rapid strides to a successful completion.

SPONGE FOR SEAT AND MATTRESS STUFFING.—A grass sponge, hitherto not made use of, has been found to be very suitable for stuffing chairs and mattresses instead of hair. It grows in shallow water among the coral formations of the Bahamas and on the coasts of Mexico and Florida. A new trade in this article has been established in New York and Boston amongst the upholsterers. It is used instead of feathers in beds as well as hair in mattresses, and at much less cost,—at least one-half, it is said,—than either. It is prepared by a patented process, in which glycerine is used to render its elasticity permanent.

A LIFE-SAVING MATTRESS.—Experiments have been made in America with the view of testing Golding's Life-saving Mattress. The mattresses in question are intended to take the place of ordinary mattresses on board vessels. The lower portion is composed of cork cuttings encased in canvas, while on top is a second mattress of hair—the whole intended to serve the double purpose of a bed and life preserver. Thus, if a passenger is awakened in the night and finds the vessel sinking he has only to pick up the mattress and jump into the water in order to be safe. The steamer *Silas O. Pierce*, having a party on board, arrived within half a mile of the shore, when five men, each having a mattress, jumped off from the vessel. The beds proved to be exceedingly buoyant, and the men sat on them and paddled themselves ashore by using their hands as paddles.

INCREASE OF LARGE CITIES.—The following statements are from a work entitled "Étude Médicale et Statistique sur la Mortalité à Paris, à Londres, à Vienne, et à New York, en 1865," by Dr. Vacher. In 1865 the population of Paris was calculated at 1,863,000; of London, at 3,028,000; of Vienna, at 560,000; of New York, a year earlier, at 1,025,000. The annual ratio of increase per inhabitant was, in Paris, 0·02 (in other words, 100 inhabitants became 102 in the course of the year); in London, 0·017; at Vienna, 0·016; and at New York, 0·35. The average number of inhabitants in a single house is, for Paris, 27; London, 7; Vienna, 54; and New York, 14; so that Vienna is the most densely peopled town of the four. From these data it appears that the increase of population at New York is equal to that of the three other towns taken together—a circumstance owing, of course, to the stream of emigration constantly flowing in that direction. In 1790 the population of New York was 33,131, and it has since been fully four times doubled. With regard to the other towns, Dr. Vacher attributes their increase to the tendency of the country people to migrate to the large centres of population, for the mere excess of births over deaths cannot account for this increase. Paris has doubled in the course of 32 years, London in the course of 40, and Vienna in the course of 44. Yet the excess of births over deaths in Paris was only 41,934 from 1836 to 1856, while the increase of population during the same period was 305,908. In London, from 1841 to 1861, the excess of births over deaths was 328,189; the increase of population, on the contrary, was 926,026.

TENDERS

For the erection of new schools at Tranmere, in connexion with the Birkenhead Union Workhouse. Mr. T. Layland, architect. Quantities supplied by Mr. W. Longson:—

Aldis	£9,298	0	0
Dobson	9,104	0	0
Cameron	8,887	0	0
Burroughs & Son	8,799	0	0
Kirkham	8,750	0	0
Chuck	8,600	0	0
Harkness & Dempster	8,526	0	0
Jones & Co.	8,237	0	0
Roberts	8,181	0	0
Campbell	8,123	0	0
Boniface	8,100	0	0
Forde	8,066	0	0
Roberts & Robinson	8,048	0	0
Hogarth	7,987	0	0
Callie	7,950	0	0
Ridehalgh	7,775	0	0
Blakeley	7,683	0	0
Anderson	7,642	0	0
Mullholland	7,535	0	0
Roberts	7,438	0	0
McCormick	7,360	0	0
Corris (accepted)	7,360	0	0

For carcassing only, two houses at Thornton Heath, Croydon. Mr. J. Berney, architect:—

Hall	£1,483	0	0
Nightingale	1,232	0	0
Crabb & Vaughan	1,190	0	0
Lose	1,162	0	0
Brett & Bradbury	1,148	0	0
George	1,127	0	0

For Congregational Church, Eastwood, Notts. Messrs. Bidlake & Tait, architects:—

Thomson	£2,191	0	0
Trow & Sons	1,934	0	0
Wright	1,832	0	0
T. & H. Herbert	1,823	0	0

For the erection of new workhouse, infirmary, &c., at Hertford. Mr. Fredk. Peck, architect:—

Chappell	£10,500	0	0
Glasscock	8,500	0	0
Moxon & Mutton	8,400	0	0
Ekins & Sons	8,373	0	0
Pattenson	8,200	0	0
Smith	8,155	0	0
Savage	7,968	0	0
Norris	7,847	0	0
Perry, jun.	7,777	0	0
Huddlestone	7,714	0	0
Bland	7,685	0	0
Henshaw (accepted)	7,320	0	0

For a terrace of ten houses at Kensington, for Mr. S. Ullman. Mr. John Dale, architect. Quantities supplied by Mr. Shrubsole:—

Macey	£16,490	0	0
Johnson	14,990	0	0
Carter & Sons	14,176	0	0
Cowland	13,240	0	0
Butt & Son	13,075	0	0
Parsons	12,986	0	0
Nightingale	12,742	0	0
Wilcox	12,696	0	0
Nutt & Co.	12,613	0	0
Munday & Hutchinson	12,400	0	0
Thorne & Co.	11,945	0	0
Grover	11,660	0	0
Cockrell	11,575	0	0
Pearse	11,500	0	0
Baxter	9,678	0	0

For new Berner's Hall, for the Agricultural Hall Company, Islington. Mr. Charles Bird, architect. Quantities supplied by Mr. Gritten:—

Axford & Whillier	£4,542	0	0
Perry & Son	4,515	0	0
Patman & Fotheringham	4,410	0	0
Webb & Son	4,333	0	0
Sharman	4,300	0	0
Brass	4,046	0	0
Hill & Keddell (accepted)	3,965	0	0

For Masonic Hall, Birmingham. Mr. Edward Holmes, architect. Quantities supplied by Messrs. Batston & Hunt:—

Naden & Son	£17,000	0	0
W. & B. N. Smith	16,950	0	0
Hardwick & Son	15,985	0	0
Matthews	15,850	0	0
Parnell & Son	15,500	0	0
W. & J. Webb*	15,078	0	0
Moffatt	14,896	0	0

* Accepted, the tender of Mr. Moffatt not being in accordance with the proper form.

For pulling down and rebuilding the court and offices of the Coopers' Company, Basinghall-street. Mr. Geo. Barnes Williams, architect to the company:—

Coleman	£4,988	0	0
Myers	4,867	0	0
Ashby & Son	4,824	0	0
Brass	4,778	0	0
Ashby & Horner	4,750	0	0
Rider	4,660	0	0
Browne & Robinson (accepted)	4,627	0	0

For the new London Pottery, Lambeth, for Messrs. J. Stiff & Son. Mr. Jas. Taylor, architect. Quantities by Messrs. Birdseye & Stone:—

Webster	£9,090	0	0
Lathey, Brothers	8,224	0	0
Killby	8,223	0	0
Holland & Hannen	8,109	0	0
Rider & Son	7,880	0	0
Clemence	7,729	0	0
Gammon & Son	7,631	0	0
Higgs	7,500	0	0
Hill & Keddell (accepted)	7,494	0	0

For cottages at Bonchurch, Isle of Wight, for Mrs. May. Messrs. Habershon & Pite, architects:—

Pritchard	£1,290	0	0
Tharle	1,282	0	0
Lale	1,250	0	0
Poxon & Smith	1,210	0	0
Newnham	1,200	0	0
Beavis & Son	1,200	0	0
Loe	1,176	0	0
Moses & Wallder (accepted)	1,150	0	0
Parson & Saunders	1,120	0	0
Denham	902	0	0

For schools at Ventnor, for Rev. A. B. Peile. Messrs. Habershon & Pite, architects:—

Pritchard	£498	0	0
Tharle	454	0	0
Lale	450	0	0
Newnham	450	0	0
Parsons & Saunders	424	0	0
Poxon & Smith	420	0	0
Loe	412	0	0
Beavis & Son	375	0	0
Moses & Wallder (accepted)	365	0	0
Denham	363	0	0

For Congregational church and schools at Tottenham. Messrs. Smith & Son, architects. Quantities by Mr. Shrubsole and Mr. Paice:—

	Entire works.			Church only.		
Adams	£4,180	0	0	£3,365	0	0
Gordon & Co.	4,085	0	0	3,087	0	0
Barker	3,958	0	0	3,378	0	0
Nightingale	3,957	0	0	3,125	0	0
Blackmore & Morley	3,583	0	0	2,800	0	0
Crabb & Vaughan	3,400	0	0	2,550	0	0
Munday & Hutchinson	3,153	0	0	2,403	0	0
Palmer (accepted)	2,820	0	0	2,179	0	0

For detached villa near Epsom, for Mr. M. Angelo. Messrs. Bacon & Bell, architects. Quantities supplied by Mr. Shrubsole:—

Munday & Hutchinson (accepted)	£1,200	0	0